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Presidential Address*

CANADIAN MEDICAL ASSOCIATION

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A YEAR'S incumbency of the highly distinguished office of President of the Canadian Medical Association, has brought me many joys and privileges, and has shown me that the presidential position is a sinecure, involving neither spirit crushing responsibilities nor financial exactions. It is one after my own heart, as those privileged to occupy it, like the lilies of the field referred to in Holy Writ, "Toil not neither do they spin," but in case any of you may recall the remainder of the quotation, I hasten to add that here the resemblance ends.

A really good president should regard himself as a figure-head on the ship of medicine, an ornamental rather than a useful appendage, who if he be wise will leave the determination of the course, and the navigation of the vessel, in the hands of the crew selected for that purpose. The functionally ill-defined job of President-Elect is, however, quite another matter, as I found it to be onerous and exacting in the extreme. It occupied my time fully during the fifteen months that preceded the combined meeting of the British and the Canadian Medical Associations.

While the presidency may be largely honorary in character, it is of supreme importance in gratifying sectional pride, and in developing those ties of fraternity and of sentiment, which do so much to unite the various provinces of this far flung Dominion. The facts of geography, and consideration of convenience have decreed that the centres of executive and editorial authority should be in Toronto and Montreal respectively, nor can I see how this arrangement could very well be improved upon, unless indeed, the heart of the Association were transferred to the real centre of Canada, which of course is the capital of Manitoba, where doubtless it will ultimately be found.

The medical profession of British Columbia have ever manifested clarity of vision and distinction of leadership, especially in the domain of medical economics. A talent for economic diagnosis has been displayed, not less notable than the ability to devise sound and well considered remedies for the evils that beset us. The preliminary report of the Royal Commission on State Medicine, has given us a foretaste of what we may expect when the final conclusions and recommendations are presented, as it is a document of commanding authority.

In passing I should like to pay a tribute to the memory and the labours of C. H. Gibbons, the Secretary of the Commission, whose recent death was a loss not only to his collaborators

* In abstract. Delivered at Vancouver, June 22, 1931. This is in the nature of a valedictory address. Dr. Harvey Smith, it will be remembered, delivered his opening presidential address at the Winnipeg meeting in June, 1930.

and the medical profession of British Columbia, but to all who are interested in medical economics in Canada. It was my privilege to know Mr. Gibbons, and only the day before his death we were in telegraphic communication concerning a summary of the final report, which he had been kind enough to offer me. In the words of Dr. H. E. Young, of Victoria, "He was a master hand in dealing with reports by commissions, and an acknowledged authority in the art of summation."

May I remind you that the fifty-first meeting of the Canadian Medical Association opened in Vancouver exactly eleven years ago to-day. That was indeed a fateful period in the affairs of the organization, which had almost reached a dead centre of collapse, owing to causes that happily do not concern us now. It was a fortunate circumstance indeed, that included among the number of those who directed its destinies at that time, were several far-sighted idealists, conspicuous in the possession of business acumen, and constructive ability. The momentous decision then made resulted in the Association going through the throes of a new birth, which was the starting point of a never slackening growth and prosperity that must be a source of infinite pride to all members of the Association, and especially those who were actively concerned with the process of revitalization.

The Canadian Medical Association, in its wide and intimate contact with all that affects our interests throughout the Dominion, is in a position of singular advantage to observe and appraise, the importance of the various trends of public and professional opinion, especially in the field of medical economics. While medicine includes many who insist that the oft heard demand for the socialization of medicine, represents little more than the vaporings of individuals who worship at the shrine of novelty, and are more vocal than intelligent or informed, nevertheless to the judicially minded student of current conditions, it must be apparent, that the economic machinery under which practice is conducted, is not geared to meet the varying exigencies of practice. It is important therefore that the Association should continue to be keenly sensitive to the problems of its constituents, and be prepared to submit, as the British Medical Association has done, proposals for the solution of the more acute economic difficulties that confront us.

At this point a brief reference to the work of the Medical Service Committee of Manitoba may not be out of place. This Committee was established under the joint auspices of the College of Physicians and Surgeons, and the Manitoba Medical Association, to study problems of economics and of service in the province, with the specific object in view of being prepared to deal with a possible demand for the introduction of a system of State Medicine by the Legislature, which had appointed a special committee to study and report upon the entire question. The investigations of the Committee revealed certain conditions relating to practice that may be regarded as typical of those prevailing to a greater or less extent in other portions of Canada. Thus it was found that extensive areas, even in the more settled portions of the province, suffered from inadequate distribution of medical services, and that the economic status of the rural practitioner, is not improving but rather the reverse, making him distinctly more responsive to the suggestion of greater security of income from contract practice. It was found that in the rural districts the population had increased 11 per cent, but had suffered a reduction of 7 per cent in the number of practitioners. Owing to the desperately hard times that have prevailed on the prairies during the past year, the rural doctor is regarding with keen interest, and a considerable degree of favour, the fixed salary plan as an acceptable basis upon which to conduct his professional ministrations. The recent publication by "The Committee on the Costs of Medical Care" on "The Municipal Doctor System of Saskatchewan," adds still further to the mounting tide of testimony in its favour. It is apparent that competent medical men cannot be induced to practise in certain rural areas, nor indeed can they afford to do so, unless given an adequate income guarantee or offered employment upon a full time salaried basis.

In studying the earnings of Manitoba physicians it was found that the averages correspond closely to those submitted by various authorities, and that 29 per cent of all the work done was not paid for. This computation was based upon a very moderate fee scale, and showed

that the value of free service given outside hospitals amounted to approximately eight hundred thousand, and in hospitals to five hundred thousand dollars annually.

I take it that these figures present a reasonable true picture of the contribution made by the medical profession of Canada towards the welfare of her people, a contribution—be it noted—that receives no recognition whatever at the hands of governments or municipalities. I submit that it is neither just nor economic that the medical man, in addition to meeting the obligations of good citizenship, statutory and otherwise, should be called upon to relieve the taxpayer of his responsibility for assuming the financial burden involved in the care of the indigent sick, a burden that in terms of time and cost is exacted of no other class in the community. This is a subject that might very properly receive the earnest consideration of the Association, in regard especially to tax exemptions. The Medical Service Committee has gone carefully into the matter of State Medicine, but is not prepared to submit any plan for the province. However, should a scheme be brought forward by the Government, the profession are prepared to present proposals for a service approved by the practitioners of Manitoba.

In this connection may I suggest that in the interest of uniformity in principle, method and practice, the Association should consider the preparation of a plan acceptable to the profession of the Dominion, under which its members would be willing to act, should any of the provinces attempt to introduce legislation providing for the establishment of state medicine in any degree or form, in excess of that which may already prevail. In a communication recently received from the Member of the House of Commons, who presented the resolution dealing with State Medicine last April, he says, "It is a problem that will have to be reckoned with before very long. I do not know whether it is a provincial or federal matter, but I believe that unless it receives federal consideration and supervision, which will make national medicine uniform in all the provinces, the results will be unsatisfactory." The introduction of this subject upon the floor of Parliament, and the keen, intelligent and non-partizan debate that ensued, possesses a significance that will not go unrecognized by the members of this body, sentinels on the watch tower of the medical edifice.

Closely allied to the foregoing subject is that of supplying medical services to persons below a certain income level, upon an insurance basis. I have already spoken on this topic during the year, but I regard it as of such importance, that even at the risk of wearying you, I must again give expression to the opinion, that the time is ripe for organized medicine to devise plans, actuarially sound and business-like in character, that might be acceptable to individuals or interested groups who consider it desirable to adopt the insurance method as a basis for offering medical care. The evidence available during the period of economic distress we are passing through, further emphasizes the need of an alternative system to the existing method of paying the doctor.

The debate that took place in the House of Commons on the twenty-ninth of last April, on unemployment, indigency and sickness insurance, revealed that political leaders of all parties are well informed on this subject, and thoroughly alive to its possibilities, economic and political, especially the latter. In my view the time is ripe for this Association to utilize its commanding influence and authority, to create and mould the opinion of its members, and to direct the views of citizens, and especially our legislative representatives, on this matter which is daily assuming larger proportions in the public eye.

My interest in sickness insurance has been stimulated recently by perusal of the literature issued by "The Essex Public Medical Service" which, as the name implies, operates in the county of Essex in England, and offers medical care at a very moderate price. It has been organized and is directed and controlled by medical men. Its service is available to persons under an income level of $1,250 a year, and 17,000 persons are enrolled upon its books. It has been in operation for eight years, is available to those ineligible for the benefits of the panel system, and the Secretary, with whom I have been in correspondence, informs me that it has been "very successful." Recently the organization has extended its activities by the formation of a second company which offers

medical care to individuals whose annual income is not below $1,250 nor in excess of $2,000.

The principles upon which these services have been established appear sound, and might well repay investigation by this Association, with the idea of formulating a model plan, under which the control of our economic destiny would remain in the hands of practitioners, and would remove the reproach under which we suffer, that organized medicine is not fully alive to its own interests, and to the significance of the currents of criticism that prevail both within and without our ranks, and that we permit the perpetuation of a system, archaic in origin, inelastic in operation and in many respects economically unsound.

Before closing, it may not be inappropriate to refer to the ninety-eighth annual meeting of the British Medical Association, which was the outstanding event in the medical history of Canada. The number of distinguished men in attendance, the high quality of the papers and addresses, and the opportunities afforded physicians from practically every portion of the Dominion to meet our visitors, served as an inspiration to Canadian medicine, the momentum of which will last a very long time. We must all be gratified by the very generous expressions of approval of the programmes and arrangements, that came to us from every portion of the Empire.

Allowing a reasonable discount for the euphemistic and kindly attitude of our brethren of the Empire towards their kith in Canada, I think we may be well satisfied with the results obtained, and feel happy in the knowledge that this meeting has been a credit to the medical profession of the Dominion, and will contribute in no mean way, in terms of mutual friendship and understanding, towards upbuilding the British Commonwealth of Nations. I sincerely hope that twenty-five years will not elapse before the British Medical Association comes to Canada again, and when it does, if I have not been gathered to my fathers, I pledge myself to uphold the claims of Vancouver as the place in which the meeting should be held.

One further reference and I am nearly done. May I remind you that the Centenary of the British Medical Association will be celebrated in 1932, under the distinguished Presidency of Lord Dawson of Penn, in London. The occasion will be notable in the annals of British medicine, and of the great Association that was founded by Sir Charles Hastings in Worcester, ninety-nine years ago. I hope as many members of this Association as possible will visit England next summer, where I am assured an extraordinarily cordial welcome will await them.

I cannot bring this address to a close without giving expression to my heartfelt gratitude for the many kindnesses I have received from the members of this body, individually and collectively, during the past two years. I should also like to record my profound appreciation of the magnificent support the profession of Winnipeg were given, by practitioners and medical bodies in every portion of Canada, in making the meeting of the British Medical Association a source of pleasure and profit to our visitors, and of pride and satisfaction to ourselves. I need scarcely remark that it has succeeded notably in strengthening those ties of sentiment and of fraternity, that so happily unite the members of our great calling throughout the Empire, under one crown, and under one flag.

OBSERVATIONS ON THE MANAGEMENT OF HYPERTENSION*

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BLOOD pressure is considered to depend on three factors, the cardiac output, the volume of the blood and the peripheral resistance. The latter is regulated by suitable neurogenic impulses to the vasomotor system. Any alteration in the first two conditions is normally very quickly followed by changes in the vasomotor tone in an attempt to maintain a normal blood pressure. It seems obvious that in any marked and continuous variation of the blood pressure, such as is found in hypertension, the cause should be sought in the field of peripheral resistance.

Many authors have considered the increased peripheral resistance in hypertension to be in the arterioles. Ellis and Weiss,[9] by measurement of capillary pressure in normal subjects and in patients with hypertension, showed that the increased resistance was in the arterioles. Wagenmann,[28] as early as 1897, and in the following year Elschnig,[8] reported the observation of spasm of the retinal vessels in hypertensive states. Gipner[10] recently published a comprehensive report of retinal changes in which he stated "In mild benign hypertension the retinal arteries show uniform exaggeration of the arterial reflex and uniform constriction of the calibre of the arteries which have regular lumina." "As the fibrosis increases, there is added to the generalized reduction in calibre of the arteries, areas where still further reduction in calibre is present, so that there is a generalized irregularity in the calibre of the retinal arteries giving the picture of hypertensive sclerosis."

A review of the literature on the relation of hypertension to cardiovascular-renal change is beyond the scope of this paper. However, considerable evidence has been advanced to show that many cases of hypertension were primarily the so-called essential type, and that diseases of the kidneys and blood vessels, which were formerly considered a cause of hypertension, were in reality results of the increased blood pressure. This view was upheld by Moschcowitz.[23] O'Hare and Walker[25] have reported that in their experience all cases of retinal sclerosis had presented elevated blood pressure some time previously, and that patients whose blood pressure had been normal never developed sclerosis of the retinal vessels, even in the presence of sclerosis of the peripheral arteries. Kernohan, Anderson and Keith[19] have observed in biopsy specimens of voluntary muscle in patients with hypertension a hypertrophy of the media and proliferation of the intima of the arterioles in a large percentage of cases.

Clinical investigators have frequently noted that patients with hypertension showed stigmata of autonomic imbalance. Sigler[26] believed that the rise of blood pressure in these cases was due to an instability of the vegetative nervous system. Lian, Stoicesco and Vidrasco[21] have shown in their studies of the vegetative nervous system that in permanent arterial hypertension there was a vascular sympathetic hyperexcitability. The vaso-constrictors are innervated by the sympathetic and the vaso-dilators by the parasympathetic system. Thus it appeared logical to seek a cause of the increased peripheral resistance of the circulation in the autonomic nervous system.

The sodium ion has been considered for a number of years as a vascular constrictor, although there has been published little experimental evidence of such an effect. Macht,[22] while studying the action of potassium and sodium iodide on the heart and blood vessels, concluded that sodium was a vascular constrictor. Allen[3, 4, 5] has been an advocate of the theory that the retention of sodium chloride was a cause of hypertension. Bayer,[6] Houghton,[16] Calvert and Lane,[7] Higley and Field[15] have published results of clinical investigation to support this contention. Houghton[17, 18] demonstrated a low blood sodium chloride in many cases of hypotension. The work of

* Preliminary report from the Out-Patient Department, Toronto Western Hospital, Toronto, Canada.

Addison[1, 2] indicated that sodium was possibly the "toxic factor" in increased blood pressure. In the toxæmias of pregnancy Harding and Van Wyck[12] have noted a distinct rise of blood pressure following the administration of sodium salts.

Much experimental evidence has been published showing that potassium favours the irritability of the parasympathetic and the vaso-dilators. Titajew and Unik[27] demonstrated that in the complete absence of potassium in the perfusion fluid there was no action of the vaso-dilators. Kylin's experiments[20] indicated that with adrenin injection, calcium raised, while potassium lowered, the blood pressure. Thus the higher the relative amount of potassium, the more pronounced was the vagotonic effect of adrenin. Hering[14] has shown experimentally the vagotonic action of potassium on the heart, while Heinekamp[13] produced inhibition of the heart by the action of potassium on the cardio-inhibitory centre in the medulla oblongata. Macht investigated the action of potassium on the blood vessels and found that it caused vascular dilatation and lowered blood pressure. Goerner and Haley[11] demonstrated that the depressor substance of hepatic extract was monopotassium dihydrogen phosphate. Addison[2] observed, in several patients on a low sodium chloride diet, a fall of blood pressure following the administration of the various salts of potassium.

Our first observations in this field were made on cases with restriction of sodium chloride in their diet, accompanied by the use of the various bromide salts. It was noted that the blood pressure was much better controlled when the potassium salt was used. Sometimes following this the iodide and chloride of potassium were given, and more recently the citrate.

Encouraged by these findings and the work of Addison, it was decided to investigate further the management of patients with hypertension by this method. In view of the experimental evidence of the relation of the ionic salts to the autonomic nervous system, and to the control of blood pressure, the sodium was limited and the potassium increased in the intake. Due to

CHART I

Case No.	Age	Duration of H.B.P.	Symptoms	Urine	Average B.P.	Potassium-Grains Daily: Blood Pressure, Readings by Weeks													Clinical Results
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	
10	50	5 yrs.	Dizziness Insomnia Dyspnœa Nervousness Headache Epistaxis	S.G. 1018 Alb.– Sug.–	190 120	96 200 108	96	96 180 105	128	128	128 160 98	128	128	128	128 150 98					Complete relief of symptoms.
21	48	2 yrs.	Œdema Pains in legs Nervousness Insomnia	S.G. 1020 Alb.– Sug.–	240 110	84 160 100	84	84 155 100	84	84	84 160 110	84	84 136 80	irregular	gulmous	arsunts	malts	ll	9 mos. 154 96	Marked improvement.
34	44	5 yrs.	Headache Shooting pains in head Dizziness Dyspnœa Insomnia	S.G. 1009 Alb. trace Sug.–	284 130.	108 226 110	108 234 120	108 204 112	128 210 110	128	128	128	* 128 240 110	128	128 216 120	128	128 182 106	128	128 178 95	Much improved.
37	66	10 yrs.	Palpitation Precordial distress	S.G. 1010 Alb.++ Sug.–	258 130		96 210 116	96	96 246 110	96	96	96	96 200 90	96	96 200 88	96	96 200 88			Much improved.

* Increase of sodium intake due to error in diet.
H.B.P.—High blood pressure.
B.P.—Blood pressure measured in mm. of mercury.
S.G.—Specific gravity.
Alb.—Albumin.
Sug.—Sugar reducing Benedict's solution.

the action of calcium on the sympathetic, an excess of this ion has been excluded. It was thought best as a result of some clinical observations to limit also the intake of magnesium which was often taken in appreciable quantities by patients with increased blood pressure.

MANAGEMENT

The findings in a consecutive group of 45 cases coming under the care of the author have been analyzed for this report. Blood pressure readings were taken at least six times in the sitting position, under as nearly the same conditions as possible, and the average recorded. The usual activities of the patients were allowed. A low sodium diet with a limitation of calcium and magnesium was prescribed as a routine. In an attempt to gain the best cooperation of the patients, a departure from the usual method of diet regulation has been used. Instead of giving the patient a list of prohibited foods and drugs, the details of their diets have been discussed with them and a substitution suggested where elimination was necessary.

The dosage of potassium citrate prescribed varied from 26 to 128 grains daily. This was determined by the height of the blood pressure, the urgency of the patient's clinical condition and the response to treatment.

The accompanying chart has been compiled as a summary of the findings in four cases selected to illustrate various types of response to treatment. The rise of systolic and the lowering of diastolic pressure recorded in case No. 10 was noted on several occasions, and was concomitant with general improvement of the circulation. Case No. 21 represented a large group of patients whose blood pressure responded rapidly and remained nearly normal as long as treatment was continued. In contrast was case No. 37 in which the blood pressure remained considerably above normal, although the patient's clinical condition was much improved. This type of case usually had renal impairment secondary to the hypertension and demonstrable fibrosis and sclerosis in the arterioles of the retina. Another group, with markedly elevated blood pressure, of which case No. 34 was an example, responded slowly but steadily to strict dietary regulations and large doses of potassium. Dietetic errors proved most detrimental to the results with these patients.

All cases showed a decided fall of blood pressure under treatment. Eleven patients with a systolic blood pressure of 200 or over showed an average drop of 64 mm. over a period varying from one to eighteen weeks. An accompanying mean fall of 25 mm. of diastolic pressure was considered quite noteworthy.

More pronounced than the drop of blood pressure has been the improvement in the patient's clinical condition. Invariably such distressing symptoms as insomnia, nervousness, dizziness, frequent headaches and shooting pains in the head have disappeared. A decrease of nycturia was constantly experienced by the patients as they improved. In cases with signs of cardiac failure, such as dyspnœa and œdema, compensation was quickly restored as the treatment progressed. Patients who were missed from the clinic for some time, upon investigation stated that they felt so well they could see no need for returning. None of the untoward symptoms bordering on collapse, experienced in some other methods of lowering blood pressure, have been encountered.

DISCUSSION

No reason has been observed for separating cases with chronic renal involvement from the so-called essential hypertensive group, when considering the advisability or results of treatment. Patients with definite kidney impairment, associated with elevated blood pressure, apparently had marked improvement of their clinical condition.

A knowledge of the mineral content of the various foods and the commercial preparation of foods is essential for the proper application of the diet. However, where the method outlined is not convenient the following instructions are suggested.

1. Avoid salts of sodium in the preparation, cooking or serving of foods.

2. Avoid chile sauce, catsup, salted olives, prepared salad dressings and prepared extractives.

3. Avoid bread, butter, caviar, cheese, clams, crackers, gluten feed, okra, oysters and wheat germ.

4. Avoid saline cathartics.

5. Avoid baking soda, stomach powders and any medicine containing salts of magnesium, sodium or calcium.

Until patients have been observed under treatment for a prolonged period of time no definite conclusions as to the success of this method of management are warranted. However, the results have been so uniformly successful over this period of the investigation that it was decided to publish these data as a preliminary communication. It is believed it will be necessary for all cases with well established hypertension to continue indefinitely their diet regulations, and in many, the high intake of potassium as well. If further cardiovascular-renal change can be prevented or postponed, there is justification for such management of patients with high blood pressure. Further observations on the results of treatment and an attempt to record the arteriolar calibre during the course of treatment will form the subjects of future communications.

SUMMARY

1. The sodium ion appears to be a factor in the increase of, and the potassium ion in the decrease of, blood pressure.

2. The restriction of sodium, calcium and magnesium, and the increase of potassium intake in patients with hypertension has resulted in uniform clinical improvement and lowering of blood pressure.

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LIPIODOL INJECTIONS IN NEURALGIA AND RHEUMATIC PAINS.—Following Sicard in using local injections of lipiodol for the relief of pain, F. Coste finds that this drug is harmless to the tissues, and tends to produce circulatory changes modifying pathological processes; although it lacks the immediate anæsthetic effect of novocain the relief induced is more permanent. In some cases the subperiosteal injection of lipiodol, at the point where the sciatic nerve crosses the ischial ramus, appears to cause the rapid breaking down of adhesions. When the seat of trouble is high the paravertebral injection of novocain at the level of the fifth lumbar vertebra often gives good immediate results, which may be maintained by immediately introducing a solution of sodium iodide. Coste tries novocain first, and if the improvement lasts several days he repeats the injection. If it is fleeting, he follows up with 15 c.cm. of lipiodol, given by the low epidural route. Another class of cases well treated by local injection is the "dry arthritis" group, especially mono-arthritic conditions such as the "lipo-arthritis" of Weinenbach and Francon, common in women at the menopause and affecting the knee-joint. Sicard injects lipiodol subperiosteally at the inner aspect of the upper tibial surface to infiltrate the peri-articular tissues; intra-articular injection is to be avoided, since it does no good, and often causes painful inflammatory reactions. Coste remarks that this method has proved less successful in "morbus coxæ senilis," in which condition radiant heat is still the treatment of choice. In lipo-arthritis of the knee, however, the injection of lipiodol has given far better results.—*Bull. et Mém. Soc. Méd. des Hôp. de Paris*, Feb., 2, 1931, p. 103.

THE PHYSIOLOGICAL ASPECTS OF OPIUM ADDICTION.—One of the first objectives in the studies of Arthur B. Light on the various phases of the opium addiction problem was to find out definitely, if possible, the existence of any physiological or structural changes in patients with addiction of long standing. In all the studies reported, the drug used was morphine and was administered hypodermically. Sufficient morphine was always administered to prevent withdrawal symptoms and to produce drug comfort. In practically every instance, this procedure with a well balanced diet, rich in calories, was followed by marked gains in weight. Selecting 100 cases at random, a careful physical examination resulted in absolutely negative returns except for scars of previous abscesses, the result of infection from hypodermic punctures, found in about 70 per cent. Not a single sign or symptom suggestive of drug action was detected. In many of the patients the pupils were contracted; a few, however, failed to show this condition. Careful measurements of the height and weights showed an average of 0.2 per cent above the normal compared to the average normal weight accepted by life insurance companies. Studies of vital capacities, efficiency tests, heart and circulation, the blood metabolism, endocrine functions, kidney and liver function, gastro-intestinal tract, water balance, in fact, all the modern clinical tests to determine changes in physiological function, were carried out in a sufficient number of cases to lead to the conclusion that addiction to opium or its derivatives does not produce any abnormal or harmful changes in physiological mechanisms.—*J. Am. M. Ass.*, 1931, **96**: 823.

FURTHER CLINICAL STUDIES ON THE ANTERIOR PITUITARY-LIKE HORMONE OF THE HUMAN PLACENTA

BY A. D. CAMPBELL AND J. B. COLLIP,

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SINCE in the clinical experiments with emmenin it was observed that no appreciable beneficial effect was manifested in cases of menorrhagia or metrorrhagia, we were encouraged to make a study of the effect of the second placental principle in such cases. The favourable effect of such in five cases has been commented upon in a previous paper.[1]

A more detailed study of 40 cases in which no pelvic inflammatory lesion or palpable tumour was present has now been made and the results are presented in the form of short case reports with diagrams in which an attempt has been made to show the menstrual histories. One realizes fully that it is impossible to obtain absolute quantitative data in regard to the amount of uterine hæmorrhage, but from most patients a fairly accurate account of the individual menstrual history and of its relative variations can be secured. The diagrams have been constructed on this basis.

The cases in this series have been arbitrarily placed (according to the predominating features of the menstrual history) in one of the groups shown diagrammatically in Fig. 1.

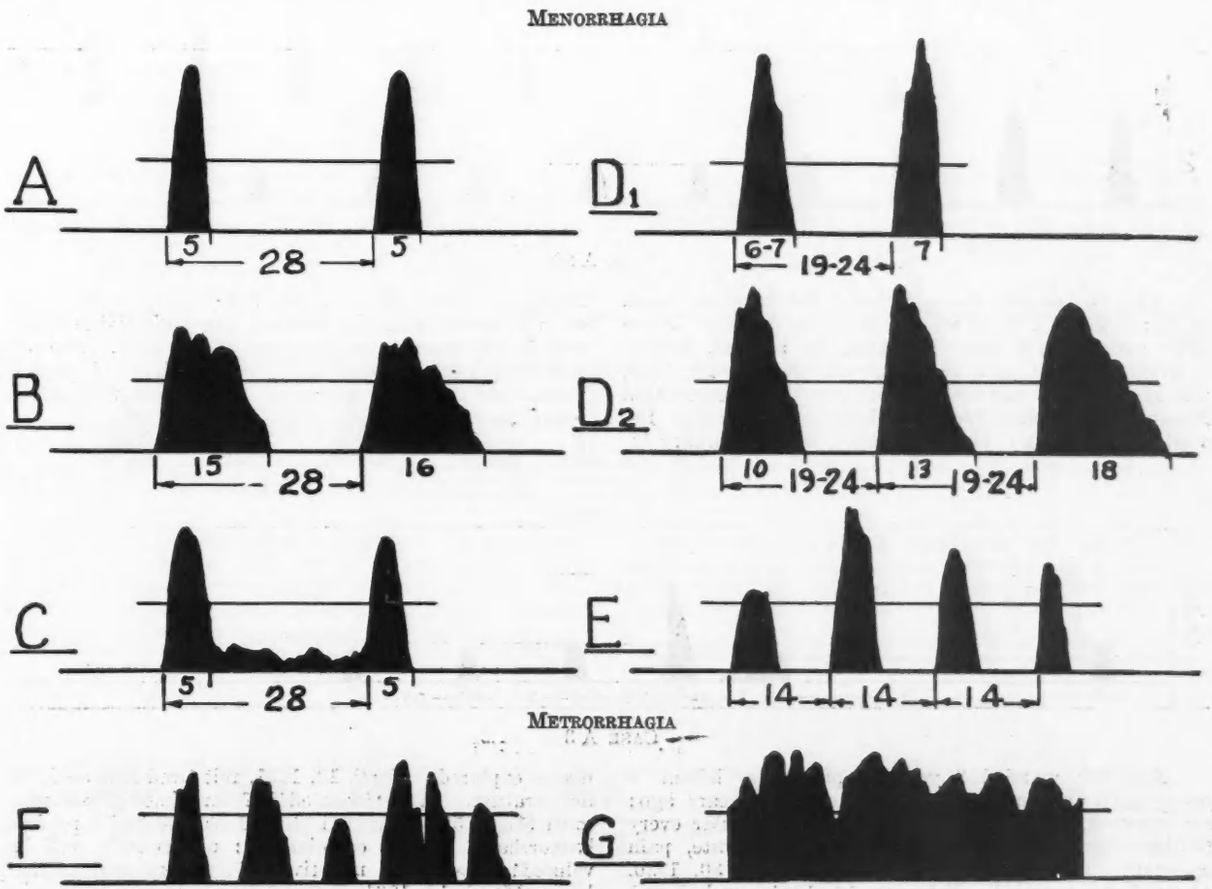
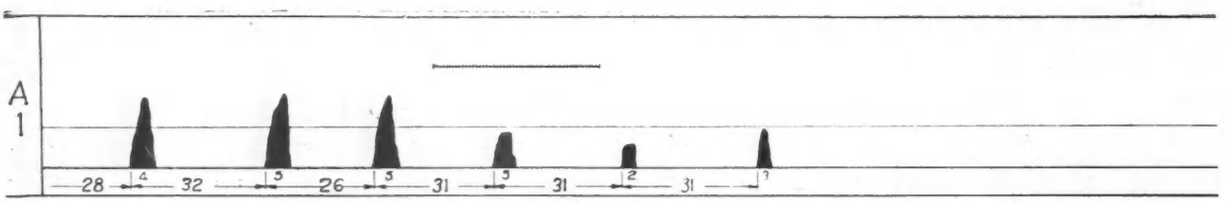


FIG. 1.—This represents the eight different menstrual types into which the cases have been arbitrarily divided. D^1 and D^2 however, may be found at different times in the same individual. The graph indicates the quantity and duration of the bleeding. The upper horizontal line represents the normal blood loss, whilst the length of the interval in days is shown by the figures below.

The extract used contained forty-day rat-units per c.c., and was prepared as outlined in detail elsewhere.[2] No special name has been given to it, and the somewhat cumbrous title of "anterior pituitary-like" is shortened to "A. P.L."

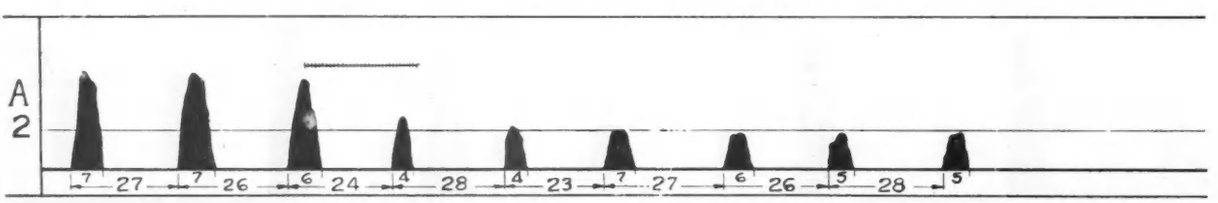
The dosage employed has been from 1 to 2 c.c. injected subcutaneously, daily or every two days for varying periods. The amount of active principle administered is therefore very small, if the human subject be compared on the basis of weight with the white rat. No doubt when more is known about the potentialities of this hormone much larger doses will be used. In general, it may be said that the length of treatment necessary was directly related to the duration of the condition and the history type of the case.



CASE A 1

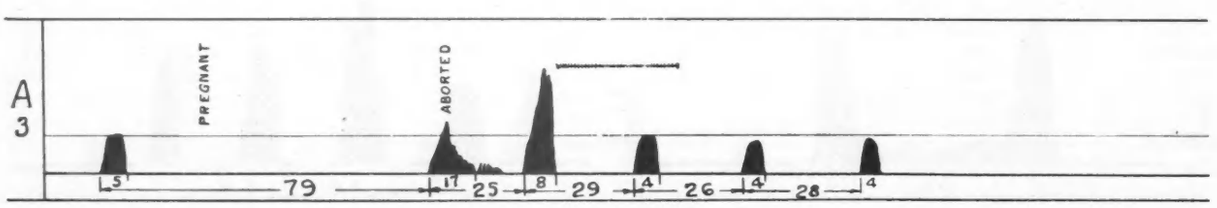
NOTE: The point at which treatment was begun is shown in each case by the cross-hatched line.

Age, 34; 1-para. Menstruation began at 14 years; regular every 28 days, lasting 3 to 5 days. For the past six months the periods have gradually become more excessive, lasting five days; she has had to remain in bed. Physical examination: all systems normal. Cervix small, slightly soft, fundus normal, firm; appendages normal. Treatment with A.P.L. instituted March 6, 1931.



CASE A 2*

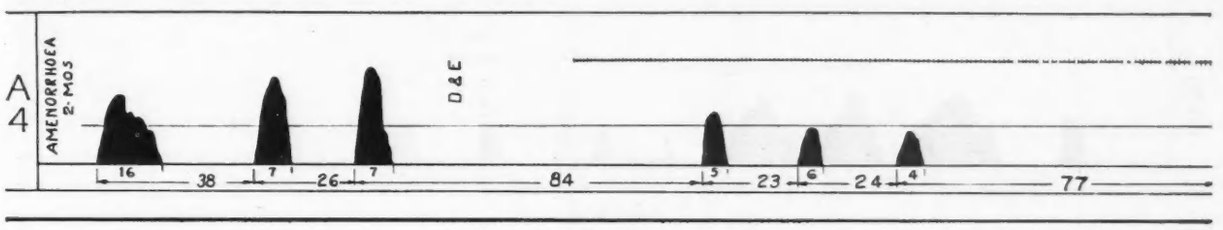
Age, 30; single; stenographer. Menstruation began at 12; regular 2 to 3 weeks; duration 7 days. Since 1927 periods have been increasing in amount, lasting 9 days; constant pain in back, On October 25, 1929, was curetted and was treated with radium. Menstruated November 26, 1929, for nine days. Amenorrhœa, December and January, 1929-30. Menstruated February 11, 1930, for seven days. From March until June, 1930, she was given emmenin, without any appreciable alteration in the amount or duration of the flow. She was extremely thin, nervous and tired; weight 82 pounds. Uterus and appendages normal. Treatment with A.P.L. began May 29, 1930.



CASE A 3

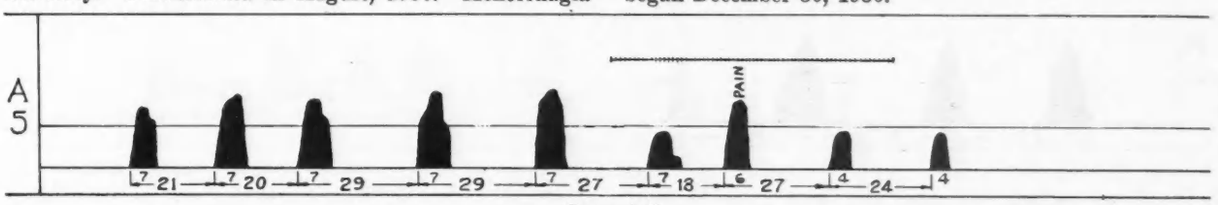
Age, 30; married 8 years; 1-para (dry labour, 8 years ago), two miscarriages, last one two years ago; not curetted. Menstruation began at 13; regular every 25 days, lasting 3 to 5 days; amount moderate, pain moderate. Last menstrual period, November 30, 1930. Aborted spontaneously, February 16, 1931; packed and uterus explored. March 19, 1931, felt tired and weak, no temperature. Has "spotted" from time of abortion until March 5th. March 13th to 15th, she had a profuse hæmorrhage. Pelvic examination: uterus soft, well involuted; appendages negative. Treatment with A.P.L. began March 19, 1931.

* Cases thus distinguished were included amongst those reported in a previous communication (*Canad. M. Ass. J.*, 1930, 23: 633). Their further history is now presented.



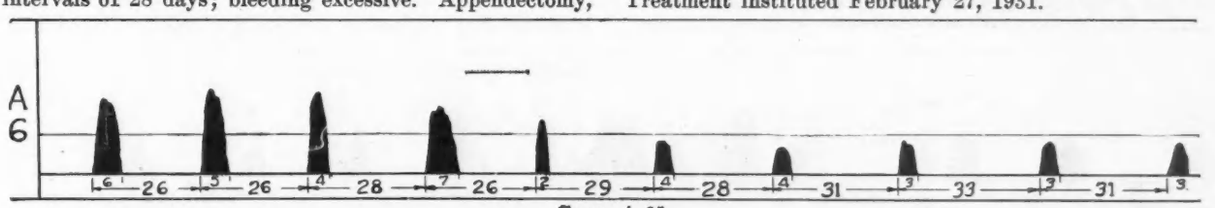
CASE A 4

Age, 49; married 21 years; 3-para, last child 19 years ago. Miscarriage at three months in 1915; curetted. Menstruation began at 14; regular until 20 years of age, lasting 4 days. From age 20, the cycles have been shorter than previously. In 1929 she had profuse flowing, lasting two weeks; improved spontaneously. Amenorrhœa in August, 1930. Menorrhagia began September 4, 1930. With each cycle since then the patient has had to remain in bed, both from the flow and on account of the pain, which lasted one day. Physical examination: well nourished; all systems negative. Uterus, normal in position, shape and size. Dilatation and exploration, December 1, 1930. Treatment began December 30, 1930.



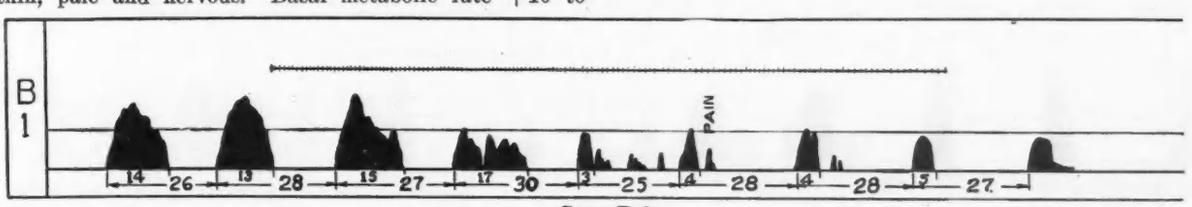
CASE A 5

Age, 25. Menstruation began at 13 years; irregular, 21 to 24 days' interval; duration 7 days; usually pain on the third day. For the past three months has had intervals of 28 days; bleeding excessive. Appendectomy, May, 1927. Physical examination: normal findings; weight 118 pounds. Uterus and appendages normal. Onset of last menstrual period, February 13, 1931. Treatment instituted February 27, 1931.



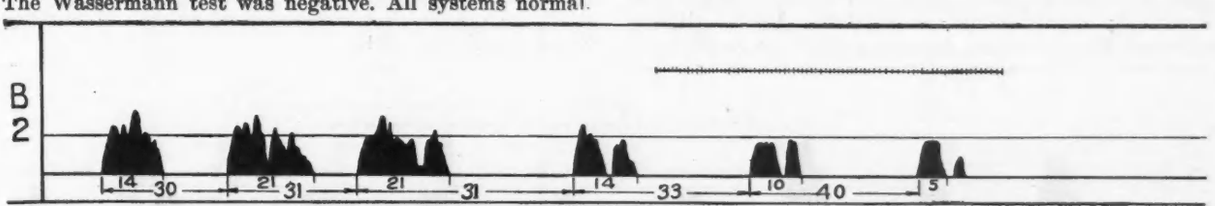
CASE A 6*

Age, 39; married; 9-para, last child in 1928. Menstruation began at 15, occurring every 3 to 4 weeks and lasting six to ten days. For the past year, periods had become progressively more excessive. Amenorrhœa, December, 1929, and January, 1930. Physical examination: thin, pale and nervous. Basal metabolic rate +10 to +21. Vagina relaxed, cervix lacerated, uterus slightly enlarged. She was curetted March, 1930. Hyperplasia of endometrium. She was given emmenin until June 9, 1930, with no improvement. Treatment with A.P.L. began June 13, 1930.



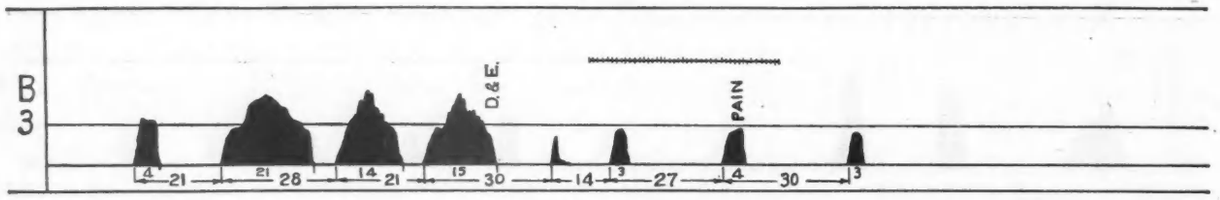
CASE B 1

Age, 35; married 6 years, no children. Menstruation began at 14; regular every 28 days. In March, 1930, the periods began to be prolonged to 13 to 15 days. She complained of feeling giddy from excessive loss of blood. The Wassermann test was negative. All systems normal. Uterus normal in position, shape and size; other pelvic viscera normal. Treated from November 18, to November 28, 1930. Recommenced December 17, 1930, and has continued.



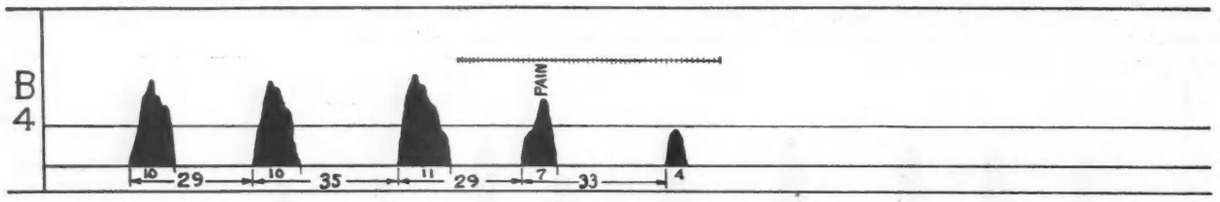
CASE B 2

Age, 33; married 13 years; 2-para, last child 4½ years ago. Menstruation began at 16; "fairly" regular, not painful; duration 3 to 5 days; amount moderate. After marriage she menstruated every three weeks for several years. Metrorrhagia in 1925, after which she was regular until November, 1930. She was in bed 3 weeks in February, 1931, for hæmorrhages. Appendectomy in 1930. Pelvic examination showed slight endocervicitis; normal uterus, palpable ovaries but which were of normal size. Treatment began March 10, 1931.



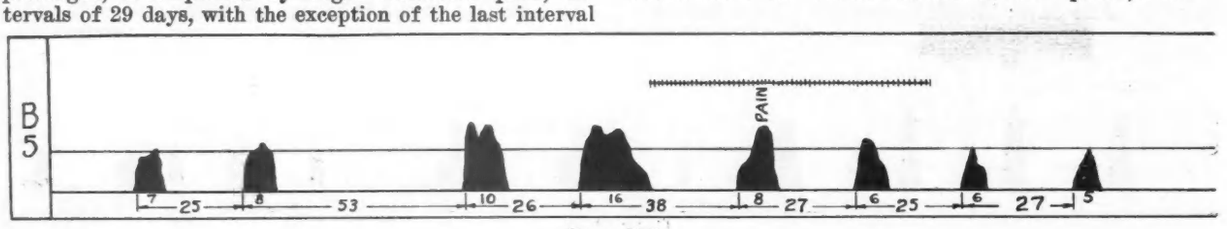
CASE B 3

Age, 33; married 11 years; 1-para. Menstruation began at 12; regular every 28 days, lasting 3 to 5 days. One still-birth six years ago; placenta prævia. For the past six years menstruation became very excessive on exertion, with cycles at intervals varying from 21 to 28 days, and lasting approximately 14 to 21 days. Menstruated January 4th to 25; February 1st to 15th. She was curetted on March 9, 1931. Physical examination: rather stout; all systems normal. Cervix slightly lacerated; uterus and appendages normal. Treatment instituted April 2, 1931. An apparently normal cycle followed 5 days later.



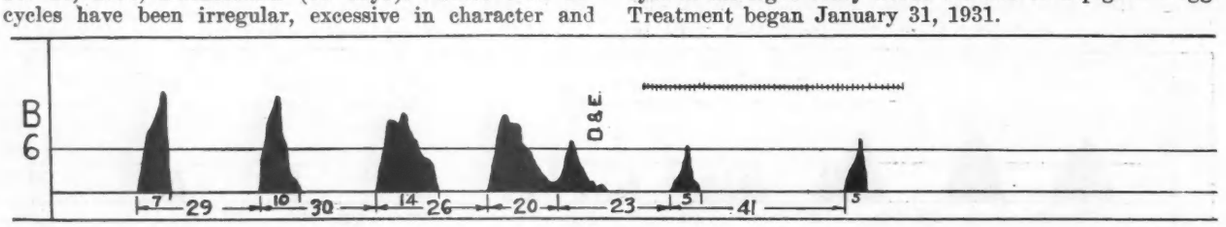
CASE B 4

Age, 54; married; 7-para, last child 13 years ago. Menstruation began at 14; regular 28 to 30 days, lasting 5 to 7 days; always slightly excessive. For the past six months periods have become gradually more profuse and prolonged, accompanied by slight menstrual pain; intervals of 29 days, with the exception of the last interval of 35 days. Physical examination: stout, well nourished woman; systems negative. Blood sugar, slightly raised. A badly damaged perineum; uterus definitely enlarged, very hard. The patient was recommended for curettage but she refused. Treatment instituted: April 9, 1931.



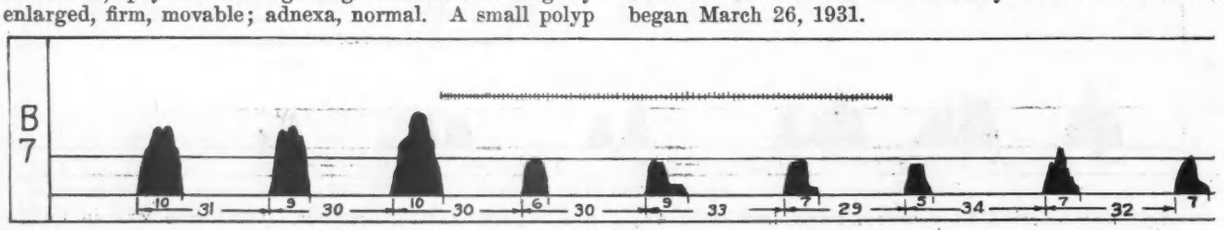
CASE B 5

Age, 36; married 13 years. Menstruation began at age of 13; regular, slightly painful, lasting 7 days; amount rather copious. From October, 1930, to December 20, 1930, amenorrhœa (53 days). Since then the cycles have been irregular, excessive in character and longer in duration. Last menstrual period, January 15th to 31st. All other systems normal. Pelvic examination: the uterus was slightly enlarged. There is a small-sized cyst in the right ovary about the size of a pigeon's egg. Treatment began January 31, 1931.



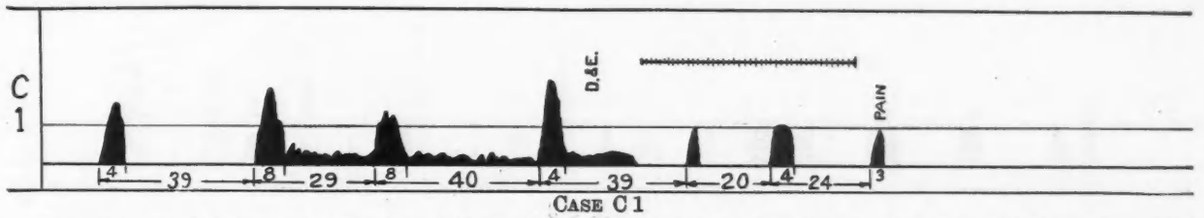
CASE B 6

Age, 50; widow; 1-para, a child 17 years ago. Menstruation began at 13; regular, every 28 days; moderate in amount, lasting six days. December, 1930, period was very excessive, lasting seven days. Since then she has had menorrhagia and metrorrhagia. Well nourished; physical findings negative. Uterus slightly enlarged, firm, movable; adnexa, normal. A small polyp in the cervical canal and small patch of senile vaginitis in the vaginal vault. The colour of this small spot, the size of a split pea, suggested an endometrioma. Admitted to hospital. Dilatation and exploration March 23, 1931. Cervix cauterized. A snipping from vaginal vault showed chronic inflammatory tissue. Treatment began March 26, 1931.



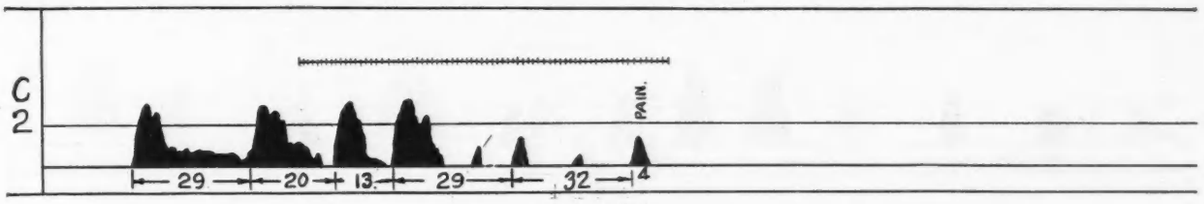
CASE B 7

Age, 21. Menstruation began at 14; irregular, every 28 to 32 days, lasting from 8 to 10 days, with clots and "membrane". Physical examination: well developed; hymen intact; pelvic organs normal. Treatment instituted November 12, 1930.



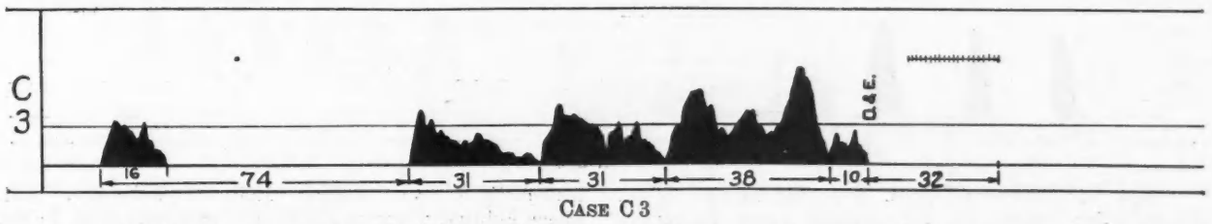
CASE C 1

Age, 35; married 7 years; 1-para, a child five years ago; 1 miscarriage six years ago. Menstruation began at 15, regular every 28 days, lasting 3 to 5 days; moderate leucorrhœa. Menstrual irregularity began January, 1926, and had been worse during the past three years; bleeding continuous until December, 1930. Physical examination negative. Vagina relaxed; uterus slightly enlarged, round and firm, external os closed; adnexa normal. Moderate endocervicitis. Curettage March 21, 1931. Treatment began April 1, 1931.



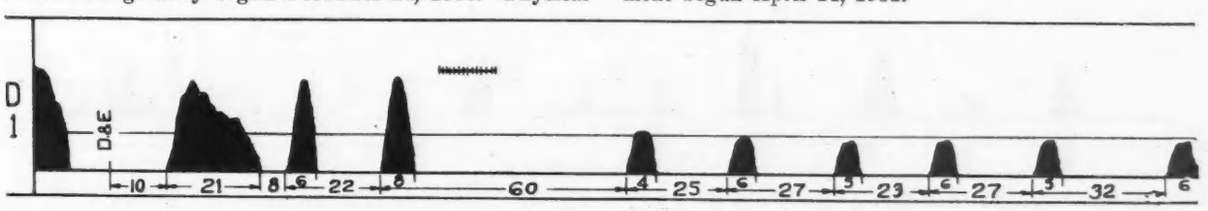
CASE C 2

Age, 45; 2-para, last child 15 years ago. Menstruation began at 13; irregular, 23 to 28 days. Moderate dysmenorrhœa until the last year. Duration 3 to 5 days; amount moderate. Characteristic intervals of 23 to 28 days continued until August, 1929. She flowed constantly from August until November, 1929. Dilatation and curettage by Dr. C. C. Gurd, November, 1929. Menstruated regularly for the following three months, *i.e.*, until February, 1930. From February to May 1, 1930, bleeding was continuous, with marked exacerbation. From May, 1930, to January, 1931, she had normal regular cycles. Menorrhagia recommenced with the onset of the regular period on January 10, 1931. Physical examination negative. Blood pressure 136/80. Vagina relaxed; uterus slightly enlarged; appendages normal. Treatment began February 19, 1931.



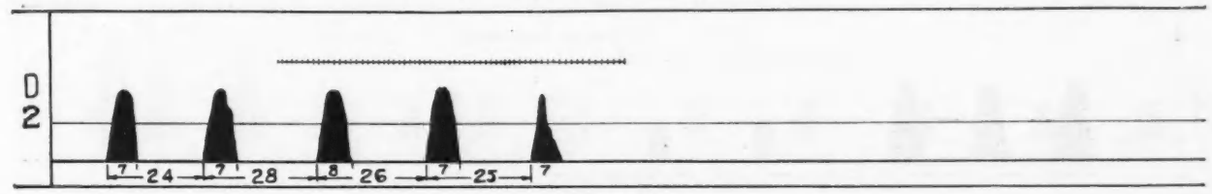
CASE C 3

Age, 26; single. Menstruation began at 17, with intervals of three months, followed by six weeks' bleeding. One year ago had amenorrhœa lasting four months. Present irregularity began December 24, 1930. Physical examination: thin, pale; the blood picture was that of typical secondary anæmia. Vagina patent; uterus not enlarged; cervix closed. Curetted April 13, 1931. Treatment begun April 14, 1931.



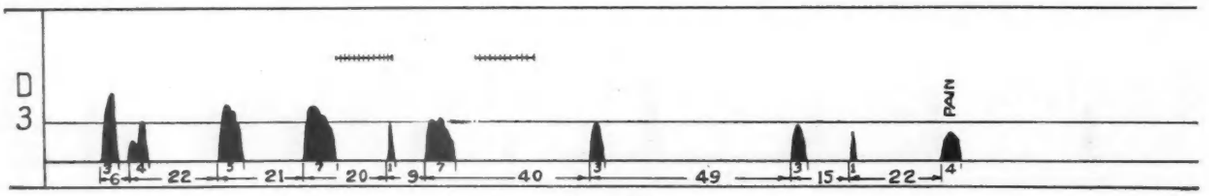
CASE D 1*

Age, 40; married 16 years; 1-para, a child 15 years ago; one miscarriage 4 years ago. Menstruation began at 14; regular every 28 to 30 days. For the past year menstruation has been increasing in amount to the point of actual hæmorrhage, and the duration has been slightly prolonged. The cycle has been altered from 25 to 23 days' interval. Physical examination: well nourished; all systems normal. Uterus slightly enlarged, firm, in normal position; adnexa normal. Dilatation and exploration in March, 1930. Emmenin given from April to June, 1930, with no improvement. A.P.L. was instituted June 16, 1930.



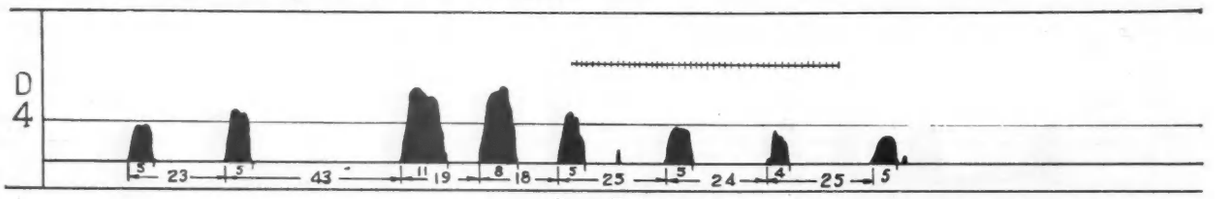
CASE D 2

Age, 24; married 1 year. Menstruation began at 13; regular every 28 days until 1 year ago, when amount began steadily increasing, lasting seven days; painful, but without vomiting. For the past year and a half, menstruation has been very excessive for 7 days, every 24 days, with marked dysmenorrhœa. Treatment commenced March 24, 1931. Effect after 3 months treatment disappointing.



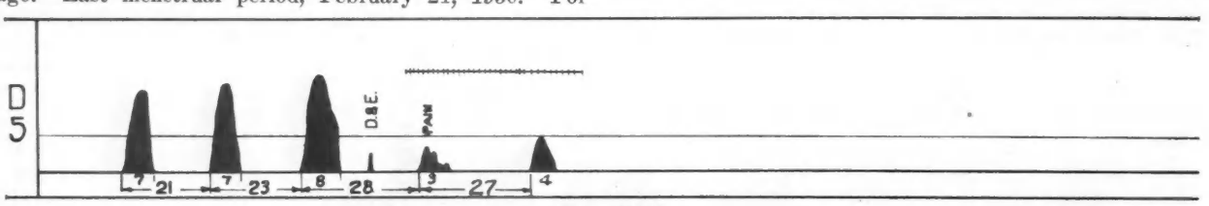
CASE D 3

Age, 14. Menstruation began at 12. Had bleeding 8 to 10 days for 5 to 6 days' duration. Constant dull pain in lower abdomen. Dilatation and curettage, February, 1930. Emmenin was given for the following six months, with no change other than a prolonged and excessive menstrual flow, but with short cycles. A.P.L. commenced November 17, 1930.



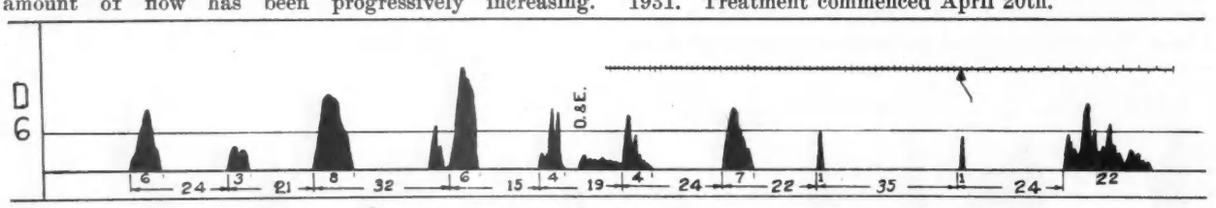
CASE D 4

Age, 40; single. Menstruation began at 14; irregular every 23 days, with amenorrhœa of three months at age of 21. Dysmenorrhœa until radium was applied October, 1930. Menstruation at present very excessive, lasting 7 to 9 days. The abnormal characteristics of menstruation with the increase in flow began five years ago. Last menstrual period, February 21, 1930. For five years has always had scanty intermenstrual bleeding, lasting 4 days, beginning 14 days from onset of previous cycle. Pelvic examination: uterus normal in position, shape and size, with a small subserous fibroid in the anterior uterine wall. Treatment commenced, February 23, 1931.



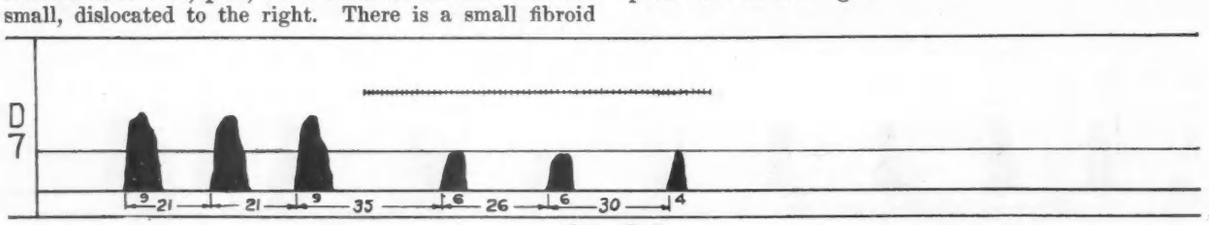
CASE D 5

Age, 50; married; 2-para, last child at age of 26. Menstruation began at 15; regular every 28 days; duration 4 to 5 days. For the past seven years the amount of flow has been progressively increasing. Amenorrhœa from August, 1930, to February, 1931. Since February, the periods have been excessive to the point of flooding. Dilatation and exploration April 10, 1931. Treatment commenced April 20th.



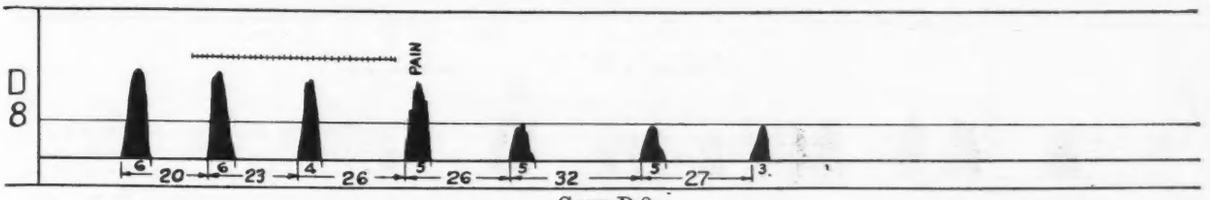
CASE D 6

Age, 49; married 15 years; a widow for 2 months. Menstruation began at 13; regular every 24 days, lasting 7 days, profuse in amount. Eight years ago was treated for menorrhagia, with some improvement. For the past six years bleeding has been excessive, with a short cycle. Note menstrual history as shown in chart. Physical examination: thin, pale, with moderate anæmia. Uterus small, dislocated to the right. There is a small fibroid the size of a filbert in the fundus; cervix slightly eroded. Dilatation and curettage January 9, 1931. A.P.L. instituted January 19th, 1 c.c. every 2 days, later (shown by arrow) the dose was reduced to 0.5 c.c. every 4 days, and continued for subsequent 46 days. The dosage during these 46 days was negligible and possibly explains the menorrhagia.



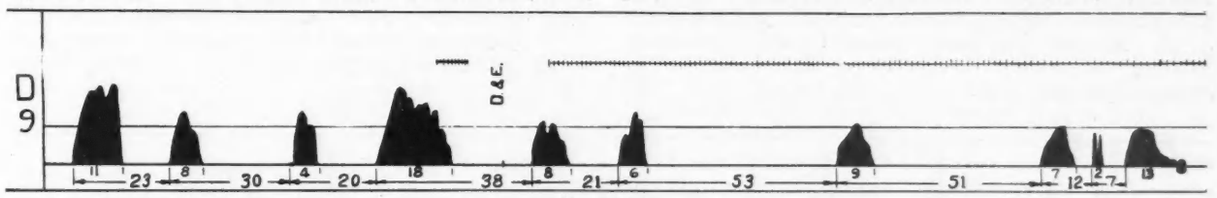
CASE D 7

Age, 22; single. Menstruation began at 14, since which time she has had very profuse periods of 20 to 21 day intervals, lasting 9 days, and accompanied by pain. General physical condition normal. Slight leukorrhœa. Hymen intact. Uterus normal in size, retroverted; no lesion in adnexa. Treatment instituted, March 10, 1931.



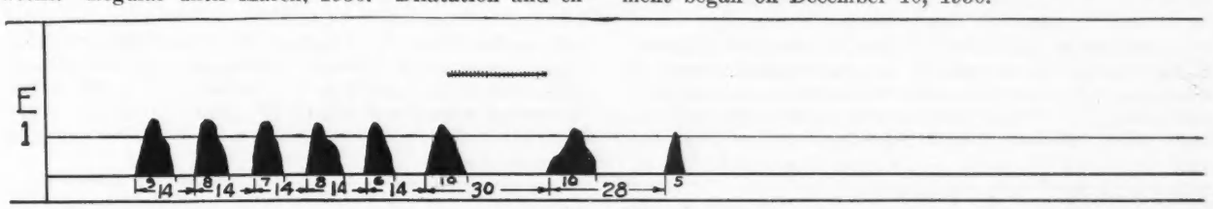
CASE D 8

Age, 24; single. Menstruation began at 12; regular every 21 to 25 days, lasting five days. She had pain with the onset of the period; amount copious with clots; slight leucorrhœa. Last menstrual period, December 22. 1930. Appendectomy in 1924. Physical examination: all systems normal. The patient complained of weakness and lassitude. Hymen intact; uterus small; no palpable pelvic lesions. Treatment commenced January 7, 1931.



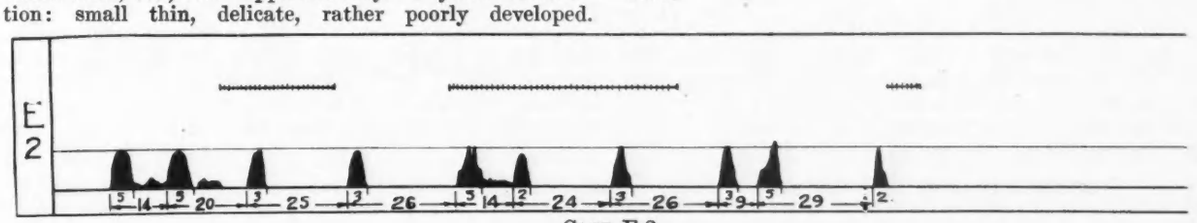
CASE D 9

Age, 51; single. Menstruation began at 14; regular until the age of 17. Duration 3 days, rather profuse. Moderate dysmenorrhœa. In March, 1929, after amenorrhœa of seven weeks, she bled continuously for three weeks. Regular until March, 1930. Dilatation and exploration with ventral fixation, 1917. Menopausal symptoms for past year. Pelvic examination: vagina patent. Uterus slightly enlarged. Cervix not firmly closed. Dilatation and exploration December 4, 1930. Treatment began on December 10, 1930.



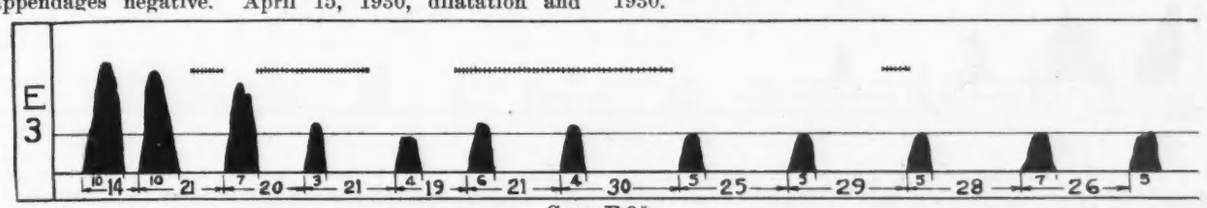
CASE E 1

Age, 15; single. Menstruation began October, 1930. Since then she has menstruated regularly every 14 days, continuing six to ten days. She had been treated with sistomensin, etc., etc. Appendectomy. Physical examination: small thin, delicate, rather poorly developed. Uterus and appendages normal. She had pain under appendix scar in right lower quadrant, with possibly adhesions into the scar. Treatment instituted April 6, 1931.



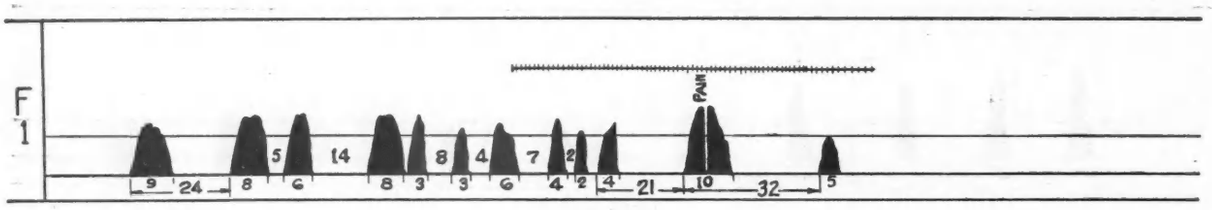
CASE E 2

Age, 35; single. Menstruation began at 13, regular, painful after age of 15. Moderately scanty with clots. Leucorrhœa. Fairly regular after 15, every 24 days, very scanty. Once went to 26 days, with vomiting during the first 12 hours. In 1926, stem pessary inserted for dysmenorrhœa; this aggravated the condition. Improved during the last two years. Pelvic examination: cystic cervix; small polyp in the canal. Uterus long and thin; appendages negative. April 15, 1930, dilatation and exploration. Polyp removed. Menstruated April 18th; no pain. Menstruated May 10th and had a great deal of pain. Emmenin did not alter symptoms. Since August has menstruated every two weeks with spotting after menstruation. Pain in back at times very severe. Examination shows a small uterus, with closed cervix; appendages normal. A small mass in the right fornix suggests endometrioma. Started A.P.L. November 21, 1930.



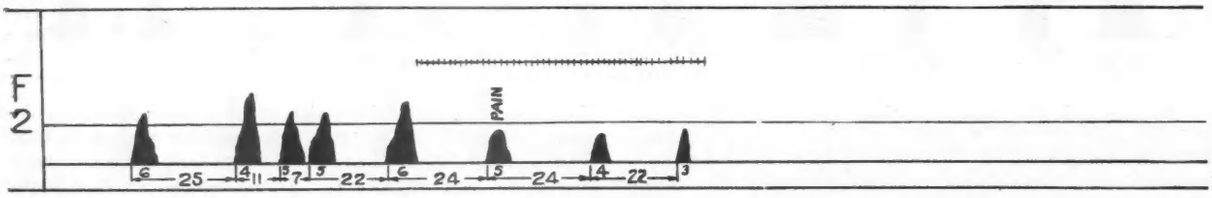
CASE E 3*

Age, 34; single. Rheumatism at 12; mumps at 9. Menstruation began at 17; regular every 28 days till December, 1928. Menorrhagia and metrorrhagia. Laparotomy in 1927. Right ovary removed. Pneumonia, Christmas, 1928, since which time the symptoms dated. Radium, 900 units, March 4, 1930; two months' amenorrhœa. Periods recommenced on a 14-day cycle, lasting 10 days and were very excessive. Physical examination: of tall angular type; all systems normal. Uterus slightly enlarged (?). Treatment instituted, June 13, 1930.



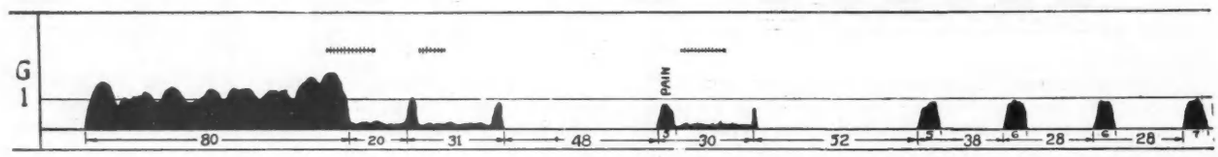
CASE F 1

Age, 22; married 3 years; 1-para. Menstruation began at 11, regular, with moderate dysmenorrhœa, of five days' duration. Throughout pregnancy in 1929 had purpura. Blood pressure, normal. Appendectomy at 16. Physical examination March 15, 1931: extremely fair hair; skin rather dark; small purpuric areas over the extensor surfaces of the lower limbs. Heart rapid, 120. No focus of infection detected. Blood pressure 120/80. Pelvic examination shows nothing abnormal. Small umbilical hernia the size of small marble. Had felt well since the delivery of her child, but since December, 1930, her menstrual cycles have been completely disturbed, as shown. Treatment commenced March 13, 1931.



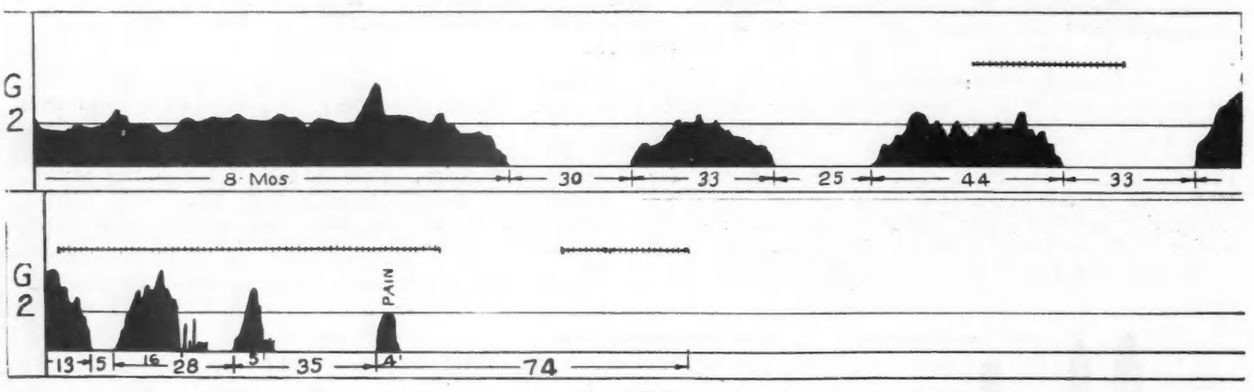
CASE F 2

Age, 21; single. Menstruation began at 13; regular, 21-day cycle. She complained of pain with the onset of menstruation. For the past six months, bleeding had been excessive. Since February 9, 1931, bleeding had been very excessive, with intervals of only a few days. Admitted to hospital for investigation. All clinical tests normal. Pelvic examination: hymen intact; uterus small, to the left; a very small cyst in left ovary. Treatment commenced March 25, 1931.



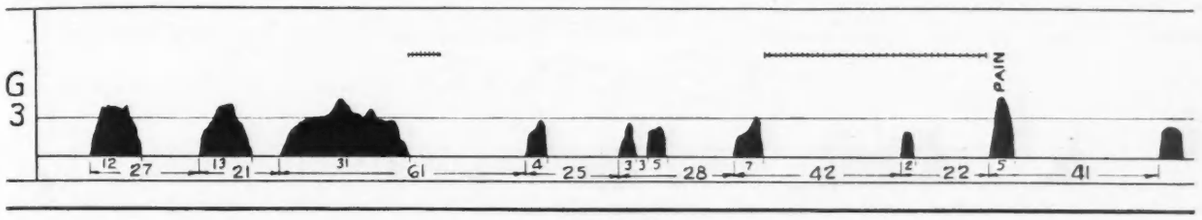
CASE G 1*

Age 36; married 1 year. Menstruation began at 17¼, and was irregular and very painful; periods every 20 to 35 days; amount excessive; duration 1 day. Two years ago had uterine bleeding for one month. Took ergot and strychnine, and was well for a time afterwards. Suddenly in March, 1930, uterine hæmorrhage began and continued. Pelvic examination: vagina and cervix normal. Uterus long, movable; appendages negative. Treatment was instituted May, 1930.



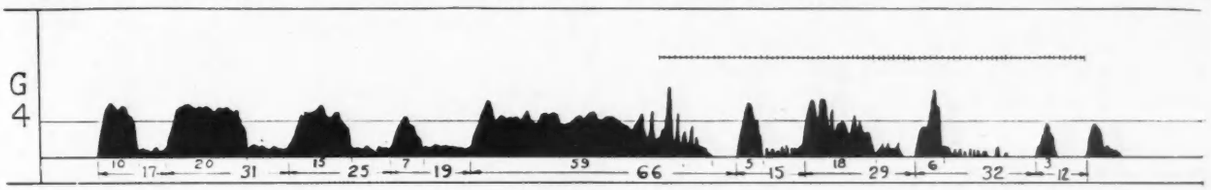
CASE G 2

Age, 21. Menstruation began at 12. Oligomenorrhœa type till 14; profuse acyclic menstruation with pain. Appendectomy at 16. Treated by x-ray in 1927, for profuse menstruation. October, 1928, dilatation and curettage followed by radium treatment for polypoid hyperplasia of endometrium; 6 months' amenorrhœa. December, 1929, menorrhagia lasting till July, 1930. August, 1930, profuse flow. Bled constantly from September 27th. The pain in back and knees was intense and required opiates for relief. Patient had never had a normal interval followed by normal menstrual period. One would regard this case as one of menorrhagia of puberty. Treatment started October 20, 1930. Ninety-two days from last period shown she menstruated normally.



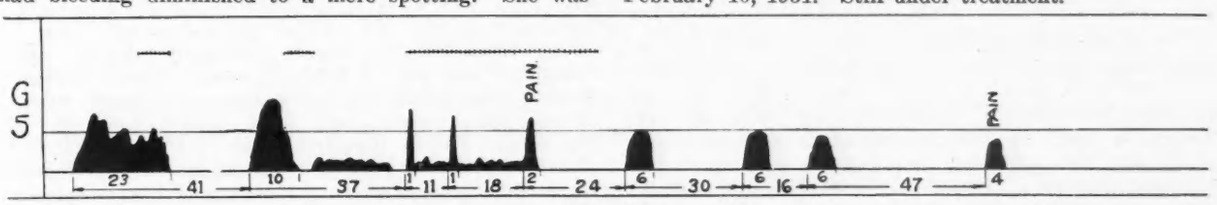
CASE G 3

Age, 24; single. Menstruation began at 13, was always irregular, 23 to 35 day intervals; painless; duration 7 to 10 days; amount rather excessive. She had lost eleven pounds in the past six months; weight now, 119 pounds. Pelvic examination: normal. May, 1930, excessive bleeding for 31 days. From August, 1930, bleeding periods prolonged. She bled the entire month of October. Treatment commenced November 5, 1930. Recommenced February 9, 1931. April 11, 1931, painful menstruation with shreds.



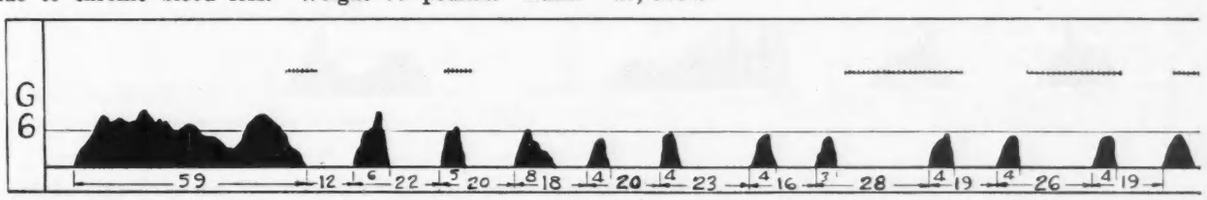
CASE G 4

Age, 35; single. Menstruation began at 14. After two cycles menstruation stopped for three and a half years. At the age of 20 periods returned on a twenty-day cycle, lasting 7 to 8 days. Examination in 1926 showed a hypertonic hard uterus, normal in shape and size; appendages negative. During 1927, menorrhagia continued. In November, 1927, was readmitted to hospital. A small ovarian cyst was found, which ruptured on examination. Curettings showed hyperplastic mucous membrane, and pre-menstrual endometrium, with no bleeding in the stroma. From that date she bled constantly: only a few days during the entire two years had bleeding diminished to a mere spotting. She was given corpus luteum and x-ray treatment over the spleen, etc. Menorrhagia and metrorrhagia ceased December 25, 1929. During 1930, the patient menstruated at regular 20-day intervals, for seven days, the amount slightly in excess of normal. In July there was a marked increase in amount and duration of period. Following the period of September 23rd to October 3rd, there was spotting for a seven-day interval, terminating in profuse menstruation. Metrorrhagia recommenced October 10, 1930. Her general appearance suggested anæmia; she had constant headache. Physical examination was normal. Pelvic examination, as previously noted. Treatment commenced February 10, 1931. Still under treatment.



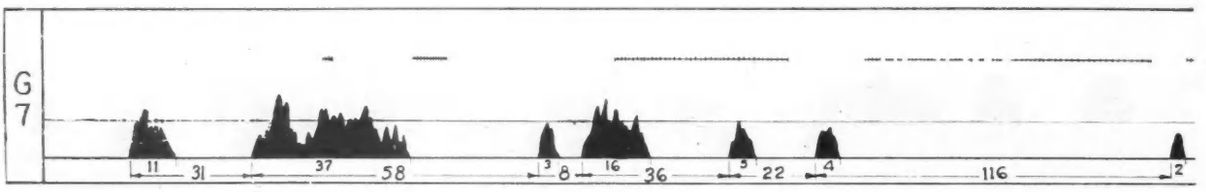
CASE G 5

Age, 15. Menstruation began at 11. First period lasted 1 month. Four regular cycles followed. Periods with intervals of fourteen days, lasting 2 to 3 days, replaced normal cycles until May, 1929. Menstruated regularly from May until September, 1929. Menorrhagia and metrorrhagia continued from September till November, 1929. She menstruated regularly November 2nd, December 1st, January 5th. On January 6th, bleeding began and continued until February 14, 1930. The physical findings were those commonly found in anæmia due to chronic blood loss. Weight 79 pounds. Basal metabolic rate +16. Emmenin administered, February 10, 1930. Four days later the bleeding stopped. Emmenin was continued until May 15th, during which time menstruation appeared approximately every three weeks, lasting 14 days or more, with an excessive amount. During May and June patient had what appeared to be two normal cycles with dysmenorrhœa. Emmenin was recommenced in July, following which the periods remained irregular and prolonged with no evidence of cycles. Treatment with A.P.L. commenced November 17, 1930.



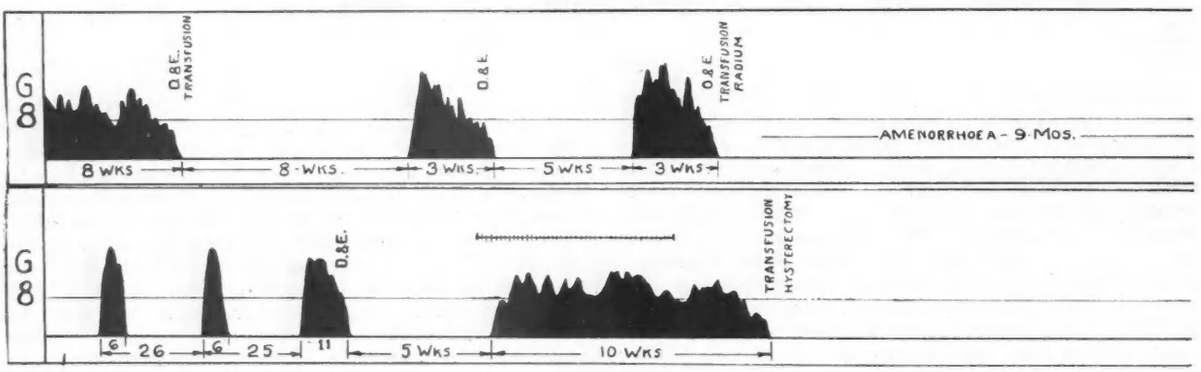
CASE G 6

Age, 20; single. Menstruation began at 12; irregular, 4 to 5 months' interval. After the first year she menstruated every 23 to 25 days: duration 5 to 6 days; slight dysmenorrhœa, with the passage of clots. On July 4, 1930, period was normal. On July 26th, at expected period, menstruation began and continued until September 2nd, varying in amount with exacerbations. Physical examination showed definite pyelitis. Pelvic examination: normal, hymen intact. Treatment commenced September 19, 1930. Note that during last 3 periods of treatment intervals were prolonged whereas when no treatment was given intervals were 19 days. Last period not shown; it was 28 days from previous epoch.



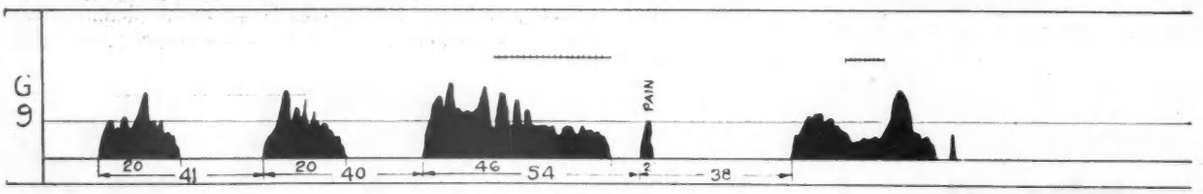
CASE G 7

Age, 22; single. Menstruation began at 14. Always irregular, with no definite cycle. Amenorrhœa at the age of 17, for one year, followed by continuous bleeding for the year following. Physical examination: thin, pale, tired; all systems normal. Uterus small, cervix soft. Appendages negative. In 1928 was given corpus luteum, quinine, cod liver oil, quartz lamp treatment, and iron, with no improvement. Dilatation and exploration April, 1928. After this she had comparative amenorrhœa for four months, with flooding from September, 1929, to February, 1930. There has never been any manifestation of cycles. She was given emmenin from April till September, 1930, without any appreciable improvement. A.P.L. instituted September 19, 1930, but not continuously.



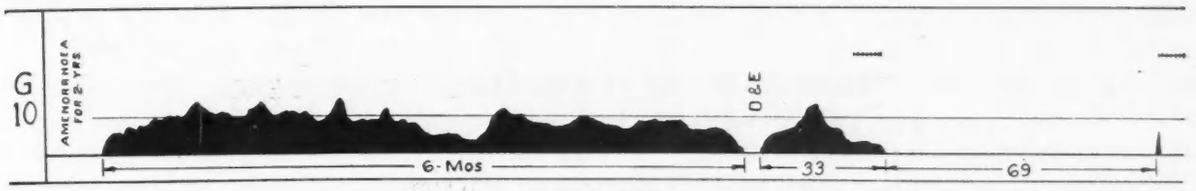
CASE G 8

Age, 35; married; 3-para, last child in 1923; one miscarriage, 1927. Menstruation began at 10, regular every 28 days, for four days. During 1928 she had continued bleeding for practically one year. She remained in bed last two months of illness. January, 1929, she was admitted to hospital with profound secondary anæmia. Transfused. Dilatation and exploration. Amenorrhœa for next two months. May, 1929, re-admitted to hospital for metrorrhagia. Small cyst in right ovary, uterus slightly enlarged. Dilatation and exploration. Amenorrhœa for following five weeks, and then profuse bleeding for three weeks. July, 1929, admitted again to hospital. Hæmoglobin 25 per cent; red cells 2,400,000. Transfused. Radium inserted. Amenorrhœa for nine months following. A.P.L. instituted July and August for profuse and constant hæmorrhage. September, 1930, admitted to hospital. Transfused. Pan-hysterectomy. Left ovarian cyst size of hen's egg. Uterus slightly enlarged. The endometrium absent in the lower portion of the uterus. In the fundus the endometrium slightly polypoid, and microscopically hyperplastic. Serial section of ovaries showed left ovary atrophied and cystic; right ovary contained corpora lutea, but not of recent development. No maturing Graafian follicles to be found. The greater portion of the ovary replaced by scar tissue. (See microphotograph).



CASE G 9

Age, 26; single. Menstruation began at 13. Regular every 28 days; no pain. In 1926 she was treated for high blood pressure. Present illness began May, 1930, since which time patient had menstruated every 2 weeks, each period lasting two weeks. During the month of August the period lasted for 31 days, the patient having to go to bed for ten days. The last period began December 25, 1930, accompanied by pain and clots. Pelvic organs, normal. Blood pressure, 170/90. Treatment instituted January 8, 1931. January 24th, bleeding profusely. She did not respond to injections. Pain every two days, passing large clots. Has had 13 injections, 1 c.c. daily. It was thought that her occupation might be a factor, and on January 30th she was taken off her machine. Treatment was discontinued and at the same time she was given a less active position. March 19th, felt better. Bleeding began again on March 22nd. (2 to 3 pads daily) with cramps. There was no apparent response in this case.



CASE G 10

Age, 53; married 33 years; 3-para. Menstruation began at 14; regular. Last period at 51. Complaints: intermittent blood-stained discharge and pain in muscles. Carcinoma of fundus suspected. October 10, 1930, dilatation and exploration; curettings showed adenomyosis. Treatment began October 12th. Has had no uterine bleeding to date (June 1, 1931).

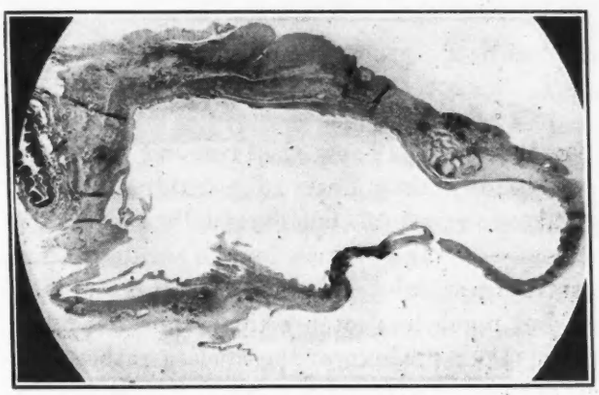


FIG. 2.—*Case G 8.* Showing almost complete replacement of ovarian tissue by cyst.

IMPRESSIONS

1. In menorrhagia of the simpler types, treatment for one week before the epoch materially reduces the flow.

2. Menorrhagia of the more severe type may require treatment for three months or longer before normal periods are established.

3. Metrorrhagia: when the continuous uterine bleeding has been in a measure controlled, the same tendency to the establishment of normal cycles as in the menorrhagia groups, has not been observed. Also, intervals of amenorrhœa may appear in such cases.

4. Pain: severe pain occurring during a period subsequent to the institution of treatment may be of prognostic value.

5. Curettement: the duration of treatment may be considerably shortened in cases where gentle curettement has been recently performed.

6. In certain of the cases treated cycles have dated from a period of metrostaxis of one to five days' duration which has occurred 10 to 18 days following the onset of the previous period of excessive uterine bleeding.

7. No enlargement or engorgement of the breast has been observed in any of the cases of this series.

8. The importance of a careful history and of a pelvic examination in the making of the diagnosis must be strongly emphasized.

9. The histological picture of the endometrium obtained by curetting is not necessarily a reflection of the clinical symptoms.

10. It would appear that the normal human cycle is 28 days.

DISCUSSION

Until more of a definite nature is known of the underlying causes of menstrual disorders it is useless to theorize further at this time. Gradually there is being established, by means of laboratory experiment, a number of facts concerning the physiological effects of active principles purified to a greater or less degree and derived from ovarian tissue, pituitary glands, placentæ, and pregnancy blood and urine. A knowledge of the physiology of any one of these hormones does not, however, help us greatly to understand the exact manner in which, in the state of normal maturity, some or all of these principles harmoniously interact, or to what extent hypo- or hyper-activity of any one gland may affect the activity of the others. Thus a case of so-called hypo-anterior pituitary disease may have, as the underlying cause of the hypo-ovarianism manifested, not necessarily a diminution in function of the anterior hypophyseal lobe, but an increase in activity of some as yet not understood inhibitory mechanism. The exact manner, therefore, in which an active principle of placental origin may restore a case of excessive menstrual bleeding to somewhat normal functioning must remain, for the moment, a matter of conjecture.

Our thanks are specially due to Drs. W. W. Chipman, J. R. Fraser, H. M. Little, L. J. Rhea and J. Pritchard, for valuable assistance with regard to clinical and pathological material; also, to many other clinicians on the staffs of the Royal Victoria, Montreal Maternity Hospital and the Montreal General Hospital.

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2. COLLIP *et al.*, *Canad. M. Ass. J.*, 1931, **24**: 201.

A STUDY OF THE ACTION OF IRRADIATED ERGOSTEROL AND OF ITS RELATIONSHIP TO PARATHYROID FUNCTION

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PART II*

THE EFFECTS OF PARATHORMONE AND IRRADIATED ERGOSTEROL RESPECTIVELY IN DIFFERENT ANIMAL SPECIES

PROBABLY the most remarkable resemblance between the actions of parathormone and irradiated ergosterol in excessive doses comes to light when the reactions of the two substances in different species are considered. Dogs and human subjects are the most susceptible of all to the influence of both these agents. In either species hypercalcæmia is induced with very great facility by parathormone. Maximal doses of irradiated ergosterol after a relatively long latent period raise the serum calcium in dogs with equal readiness. This substance in therapeutic doses induces a decided rise in the serum calcium of the human subject, and there is every reason to believe that dangerous hypercalcæmia would follow its administration in excessive doses. Hess and Lewis[7] reported the occurrence of hypercalcæmia in infants as the result of therapy with irradiated ergosterol. In one instance 5 mg. of activated ergosterol were given daily for 8 weeks to an infant 15 lbs. in weight. The serum calcium was elevated from 9 to 16.2 mg. per 100 c.c. This latter value was not reached until two weeks after the administration had been discontinued. The calcium then fell gradually, but was still above normal four weeks later. In another instance the serum calcium rose to 17.6 mg., and symptoms which we have found so characteristic of parathormone or ergosterol overdosage in dogs began to appear.

Cats are less responsive than dogs, but do react by a rise in calcium to large doses of parathormone. They also respond somewhat less readily than dogs to poisoning with irradiated ergosterol, but eventually succumb to excessive dosage in from four to six days. The gastro-intestinal tract shows features similar to, but much less intense than, those found in dogs. Deep flushing of the mucosa rather than actual hæmorrhage is the rule. The lungs are hæmorrhagic.

Rats can withstand relatively enormous doses of both parathormone and irradiated ergosterol. Bills and Wirick[38] found that 100 times the antirachitic dose of activated ergosterol was without any deleterious effect upon these animals, 1,000 times the prophylactic dose was just perceptibly harmful, 4,000 times definitely injurious, and 40,000 times overdosage was lethal. These doses were given daily over a period of weeks. Dixon and Hoyle[41] reported that rats fed upon a normal diet withstood massive doses of the sterol. Calculi were observed in the urinary tract, but none of the pathological changes described by German workers. Rosenheim and Webster[55] concluded that at least 10,000 times the prophylactic dose was not lethal to rats. Light, Miller and Frey[56] found the lethal dose to be 100,000 times the prophylactic requirement. Harris and Moore[112] gave somewhat similar figures.

With regard to the action of parathormone in these animals, Bauer *et al.*[32] found that 875 units administered over a period of 110 days were insufficient to raise the serum calcium of rats. This is more than double the dose required to elevate the serum calcium of a 10 kilo dog. Calculating, then, on a weight basis a 300-gram rat is resistant to a dose at least 100 times that which will produce a definite

* For Part I see this *Journal*, 1931, 24: 763.

response in a dog. Collip also had reported previously that rats were immune to the action of the hormone. Tweedy and Chandler,[57] however, state that a rise in serum calcium and death may result from the administration of parathormone to these animals. The doses which these observers used were colossal, and consequently their experiments in our opinion do not demonstrate a specific effect of the extract. Rats weighing 194 grams were given 10 c.c. of parathormone (Lilly) subcutaneously over a period of seventeen hours. Two out of the four of these treated animals died. The dose which was given is equal in bulk to the total blood volume of the animal and equivalent to the administration of half a litre (about 10,000 units) of the material to an average sized dog. It must be recalled that parathormone is a relatively crude extract of the parathyroid glands, having neither a pH nor osmotic pressure similar to that of the body fluids. It also must contain many substances other than the parathyroid hormone which in large amounts may be toxic. We have found that a rise in the serum calcium is a phenomenon associated with other states, *e.g.*, intestinal obstruction, severe skin injuries and adrenal deprivation, in which grave disturbances of an unknown and fatal nature occur. It must be clear then that such a high dosage of parathormone is quite unphysiological and a rise in serum calcium need not imply a specific action.

The great resistance of rats to parathormone might be only apparent, and due to more efficient excretion of calcium in the urine. Two independent observations seem to eliminate this possibility. Bauer, Aub and Albright[32] found no reduction in the bone trabeculæ of rats subjected to prolonged treatment with parathyroid extract. The density of the bone, on the contrary, was definitely increased. Day[58] gave enormous daily doses to a group of young rats over a period of more than 30 days, and then estimated the calcium and phosphorus of their ashed bodies. The total amounts of these elements were the same in the treated as in the control rats, in other words, no loss of calcium or of phosphorus had occurred.

Mice were found by Macleod and Taylor[28] to be immune to parathyroid overdosage. Tentative experiments carried out by us suggest that the lethal dose of activated ergosterol is somewhat less than that for rats. Fourteen young mice (6 to 7 grams), fed upon a Steenbock antirachitic diet, were given 1 drop of irradiated ergosterol (10,000 D) daily for three days. Six of these animals died within a week from a hæmorrhagic condition of the lungs. The remainder survived and grew to adult size.

This result indicates that a *total* dose of about 15,000 times the prophylactic rat dose of irradiated ergosterol, given over a short period, is about the lethal dose for young mice. On a weight basis the daily dose was about double that found by Bills and Wirick to be lethal for young rats. Death of the mice however occurred in only a small fraction of the time that was required to kill the animals in the experiments of the former observers. We are unacquainted with any experiments that have determined the antirachitic dose of irradiated ergosterol for a mouse, and so are unable to determine the ratio between the prophylactic and lethal doses of the sterol for this species. The large bulk of parathyroid extract and its uncertain composition preclude the possibility of determining by direct experiment the lethal dose of the hormone for a mouse, since if, as is suggested, resistance to it and to ergosterol is of about the same order, it would require a relatively enormous amount of parathormone administered subcutaneously over a short period to cause death.

Rabbits.—The data available by which one can compare in rabbits the effects of parathyroid overdosage with those caused by excess of irradiated ergosterol are somewhat incomplete. It is undoubted, however, that, as compared with dogs, rabbits are resistant to both these substances. With regard to the action of the parathyroid hormone, it was thought at first that rabbits were quite unaffected by it. Collip found that these animals were practically immune. Macleod and Taylor[28] gave large doses to adult rabbits over a period of two weeks without observing any significant rise in serum calcium. Some of the animals died, but none of those symptoms so characteristic of overdosage in the dog preceded death. Davies, Dickens and Dodds[59] showed later that a certain rise in calcium occurred when relatively huge doses were given. This finding was confirmed by Collip, who states

that though "enormous" doses do cause hypercalcæmia, the signs of overdosage observed in the dog are absent. Moritz[60] has also remarked upon the high resistance which rabbits offer to the administration of parathormone.

The observations of Kreitmair and Moll[61] indicate that the rabbit possesses a fairly high resistance to irradiated ergosterol. They found that these animals survived for 10 days though at least 10,000 times the antirachitic rat dose was given daily. Though loss in weight and death may occur in rabbits after large doses of parathormone or of irradiated ergosterol no very definite symptoms which might afford a basis for comparison of the degree of resistance which these animals offer to the two agents follow the administration of either. Perhaps our most reliable criterion for gauging the effects of either substance is the influence upon the serum calcium level. To produce a rise in the serum calcium in rabbits, massive doses of parathormone are required. Similarly, it is only with difficulty that the serum calcium level of these animals may be raised by irradiated ergosterol. Smith and Elvove[62] obtained a rise in the serum calcium of 20 or 25 per cent after 30 doses of irradiated ergosterol, each of which had a potency of 10,000 rat units. Even with amounts 20 times greater than this (200,000 rat units) given for 30 doses a rise of only 40 per cent in the serum calcium was observed. When this amount had been given for 10 doses over a period of 2½ weeks the calcium rise was less than 7 per cent. These amounts, when the weights of the two species are taken into account, are approximately 10 times the dose that will cause the death of a dog within 4 days. Smith and Elvove state that repeated doses not exceeding 20,000 rat units are tolerated well by rabbits. Harris and Stewart[63] gave as much as 10 mg. of irradiated ergosterol over a period of six weeks, without obtaining a significant rise in the serum calcium, and without causing loss of weight in their animals. (Nevertheless, calcification of the tissues had occurred.) Ashford[37] gave similar amounts which were followed by a rise in serum calcium from 13.9 to 18.8 in one animal and from 15.2 to 21 in another after 49 and 27 days respectively. No mention was made of the potencies of the preparations of irradiated ergosterol which the latter observer and Harris and Stewart employed, and it is possible that the material used by Ashford had a much higher content of antirachitic vitamin than that employed by Harris and Stewart. The preparation of viosterol (10,000 D) which we have employed in our experiments was undoubtedly of a different potency again from the solid material used by any of these observers. It is difficult for this reason to know precisely the relative resistance of rabbits and dogs to irradiated ergosterol. There seems no doubt, however, that rabbits so far at any rate as hypercalcæmia is concerned, are, compared with dogs, refractory to its action. Our experiments indicate that the lethal dose for the rabbit is, weight for weight, about a twenty-fifth of that for the rat, as determined by Bills and Wirick.[38] The results of the latter observers upon the rat and of ourselves upon rabbits are closely comparable, since the same preparation of activated ergosterol was employed in both investigations. It should be pointed out that the above figure comparing the resistance of the two species applies to rabbits fed upon an oats diet. The constituents of the diet, particularly the Ca:P ratio, are known to have a profound influence upon the toxicity of irradiated ergosterol. Rabbits fed upon green food were found by us to be very much more resistant.

Guinea-pigs were found to be from twice to three times as resistant to the action of irradiated ergosterol as rabbits. Macleod and Taylor[28] found that this species was also highly resistant to the action of parathormone. They appear to be even more resistant to the hormone than rabbits. Bodansky, Blair and Jaffe[64] have found recently, however, that guinea-pigs are not entirely unresponsive, since mobilization of the skeletal stores of calcium and the development of "experimental osteitis fibrosa" follow when very large doses are administered to young animals.

Chickens.—Massengale and Nussmeier,[65] gave 2,000 times the antirachitic dose of irradiated ergosterol to chickens upon diets with low and high calcium-phosphorus ratios respectively. In the former instances no significant effect upon the serum calcium was induced, even though the doses were continued daily for five weeks. When 6 per cent Ca CO_3 was added to the diet and the Ca-P ratio increased to 8, a

rise in the serum calcium was observed. The calcium rise, however, was not great and no injurious effects upon the animals were noted. Hypercalcæmia was not caused by ergosterol with any of the other diets employed. Hall and King[66] found the antirachitic dose for chickens to be much less than that determined by the former observers. One drop of viosterol (100 D) every other day was found to be sufficient. An experiment was carried out by us for the purpose of comparing the resistance of the fowl to parathormone* and irradiated ergosterol overdosage respectively. Twelve chickens (5 months old and weighing 1.5 kilos.) were divided into three groups of four. One-half c.c. of irradiated ergosterol (10,000 D) was given daily by mouth to group 1, and 0.5 c.c. parathormone subcutaneously each day to group II. The individuals of group III served as controls. The diet consisted of 1 part of yellow corn and 1 part of wheat, with 2 per cent oats. At the end of thirteen days no signs of overdosage were noticeable in any of the eight birds. The doses of both the irradiated ergosterol and the parathormone were then doubled. At the end of ten days' treatment with 1 c.c. of irradiated ergosterol and of parathormone to the respective groups of birds no appreciable effect was produced. One individual of each of these groups, as well as a normal bird, were then sacrificed for serum calcium and blood phosphorus estimations. No rise in the serum calcium of any of the birds was found. The value was actually considerably lower in the serum of the bird which had received the irradiated ergosterol.

The dosage of irradiated ergosterol and of parathormone to the remaining chickens was increased from this time on to 2 c.c. daily. At the end of a week all the birds were killed. The ergosterol and parathormone birds were found to have lost an equal but small proportion of their weights. The bones of neither group contained less calcium than did those of the controls. On the contrary, there was an increase of from 7 to 8 per cent in the bone-calcium of both the ergosterol and parathormone birds. It may be remarked in this connection that Bauer *et al.*[32] observed an increase in the trabeculæ of rats' bones treated with parathormone. There was no rise in the serum calcium of any of the treated birds. The sera of those receiving the ergosterol showed a definitely lower calcium content. The average values of the calcium in the sera of the normal, parathormone and ergosterol birds respectively are given in Table IV. There was no significant difference in the blood phosphorus between the treated animals and the controls.

TABLE IV

Animals	*Serum calcium*	*Serum phosphorus*
Normal	14.2	6.3
Irradiated ergosterol ...	11.8	6.9
Parathyroid extract	14.7	5.7

The ergosterol birds received daily during the final week 700,000 rat units, or about 25,000 times the dose that would be required for antirachitic purposes, yet a fall, rather than a rise, in the serum calcium occurred. The other group of fowls received daily during the same period 40 units of parathormone. This is double the quantity that will cause the death of a dog weighing 8 kilos or more. In another experiment still larger doses of ergosterol were given over a period of 7 weeks to a group of growing chickens. The serum calcium at the end of this time, though a little higher than that of the controls, was within the normal range (13.8). Daily doses of from 10 to 40 units of parathormone given to a group of fullgrown hens over a period of ten days produced no definite effect upon the serum calcium. These findings have led us to the conclusion that fowl when on a diet of which the Ca-P ratio is approximately normal are practically immune to parathormone and to the toxic effects of irradiated ergosterol. Kreitmair and Moll[61] came to a similar decision with regard to the latter substance. Hall and King[66] gave up to 8,000 times the daily antirachitic requirement to fowl over a period of 40 days. When the birds were sacrificed at the end of this time, decalcification of the bones was observed, accompanied by a diminution in the bone phosphatase, but beyond these no changes were found, either by gross or microscopical examination, which could be definitely ascribed to the treatment.

It will, we think, be agreed from the foregoing paragraphs that the effectiveness of parathormone in producing toxic manifestations in

* We wish to express our thanks for the supplies of parathormone which the Eli Lilly Co. have so generously given us for our several experiments.

TABLE V

LETHAL DOSES OF IRRADIATED ERGOSTEROL AND OF PARATHORMONE COMPARED IN SEVERAL DIFFERENT SPECIES

	Irradiated Ergosterol		*Parathormone*	
	Dose in rat units per 100 grams of animal*		*Units (Collip) per 100 grams of animal*	
Species	*Total*	*Daily*	*Total*	*Daily*
Rats	3,000,000 – 4,000,000	40,000	Resistance too high to determine toxic dose	
Mice (Young) ...	150,000 – 200,000	50,000 – 75,000†	Resistance too high to determine toxic dose	
Chickens (5 mos. old)	600,000 – 800,000	25,000	120	8
	causes no appreciable effect		causes no appreciable effect	
Guinea-pigs	150,000 – 200,000	8,000 – 10,000	100 – 200	5 – 10
Rabbits	40,000 – 60,000	3,000 – 5,000	100 or more	3 or more
Cats	8,000 – 10,000	600 – 1,200	1 – 2 causes hypercalcæmia; lethal dose unknown	
Dogs	6,000 – 8,000	400 – 1,000	0.5 – 1.0	0.1 – 0.2
Infants	?	?	?	?

* A standard rat unit is taken as the minimal daily amount (75 mg.) of a good average cod liver oil which will induce healing in a 60 gram rachitic rat in 10 days. The potency of a preparation of irradiated ergosterol is computed upon this basis. Thus irradiated ergosterol having a potency of 100 or 250 D has weight for weight 100 or 250 times respectively the antirachitic value of cod liver oil.

† The toxicity of irradiated ergosterol depends to a large extent upon the size of the daily dose as well as upon the total amount given. In the experiment which we have undertaken with this species a relatively large daily dose was given. The survival time was consequently probably shorter than if smaller doses had been given. The daily lethal dose is probably considerably less than the figure given here and the total lethal dose may be much greater.

TABLE VI

CURATIVE DOSES OF IRRADIATED ERGOSTEROL, COD LIVER OIL AND PARATHORMONE IN DIFFERENT SPECIES

	Irradiated Ergosterol	*Cod Liver Oil*	*Parathormone*
Species	*Rat units per 100 grams animal per day*	*Rat units per 100 grams animal per day*	*Units (Collip) per 100 grams animal per day*
Rats	1.3	1.7	?
Chickens	1 – 2	1 – 2	?
Dogs	?	1 – 2	0.03
Infants	Dose prescribed varies from 2 – 10	1 – 2	0.03

The values in both the foregoing tables are of necessity only approximate.

any species in which the action of the hormone has been investigated runs closely parallel with that of large doses of irradiated ergosterol. Nevertheless, it is, we believe, a significant fact that for those species in which this has been studied, namely, rats, chickens, dogs and the human subject, the antirachitic dose is of the same order of magnitude in all. See Tables V and VI.

In other words, whereas in the different species the physiological action of irradiated ergosterol appears to be induced by comparable amounts of this substance, the tolerance to excessive doses varies enormously. The latter exert a toxic effect upon the calcium metabolism of a given species in a manner and to a degree which is dependent upon a susceptibility common to the sterol and to parathormone. The main points of similarity between the actions of parathormone and irradiated ergosterol are given in Table VII.

TABLE VII

THE EFFECTS OF IRRADIATED ERGOSTEROL (LARGE DOSES) AND OF PARATHORMONE COMPARED

1. *Effect upon the course of tetany.*—Rapid and complete cure by a single dose of irradiated ergosterol (1 c.c., 10,000 D) or of parathormone (20 units).
2. *Symptoms.*—The psychic changes, lassitude, anorexia, vomiting, loss of weight, weakness, the passage of blood in the stools and vomitus and other symptoms are identical in the two conditions when the acute type of poisoning is induced by large doses.
3. *Duration of life with maximal doses.*—Usually about 24 hours longer with irradiated ergosterol.
4. *Post mortem.*—The macroscopic and histological findings are identical.
5. *Blood changes.*—Hypercalcæmia, rise in N.P.N., late rise in inorganic phosphate and terminal fall in calcium occur at the same time and are of the same magnitude in both conditions.

6. *Excretion of calcium and phosphorus.*—So far as the data are available both agents affect calcium and phosphorus excretion similarly.
7. *Source of the excess calcium.*—From within the body in both conditions and most probably from the bones.
8. *Phosphatase.*—Both agents cause a pronounced fall in plasma phosphatase.
9. *Urinary changes.*—Both substances affect the volume, titratable acidity, phosphorus and calcium in the same way.
10. *Species susceptibility.*—Those species resistant to parathormone overdosage are also resistant, to about the same degree, to overdosage with irradiated ergosterol.
11. *Calcium deposition in the soft tissues.*—Metastatic calcification results from the prolonged administration of either substance.[42, 61, 62, 63, 67, 68, 69, 116, 121]

THE ADMINISTRATION OF ERGOSTEROL BY DIFFERENT ROUTES

Intravenous.—In the great majority of our experiments ergosterol has been administered by mouth. Shortly after the intensely toxic effect of irradiated ergosterol was first observed and the remarkable similarity between the gastro-intestinal changes induced by this substance and by parathormone was recognized, the question naturally arose whether the hæmorrhagic extravasations were due to a local action of the sterol upon the mucous membranes or, as with parathormone, they would follow upon parenteral administration. One c.c. doses of viosterol (10,000 D) were therefore injected daily into the saphenous vein of a large dog (No. 47). This animal developed the characteristic symptoms and died in five days. The typical pulmonary and gastro-intestinal signs of overdosage were found post mortem. Since then a sufficient number of animals have been injected with the material intravenously to demonstrate that it is at least just as effective when injected directly into the blood stream. We are unaware that the intravenous action of viosterol has been previously recorded.* Ten normal animals altogether have been given irradiated ergosterol intravenously. In all a pronounced rise in serum calcium followed, and in each of those to which a dose equivalent to the oral dosage was given death occurred at the usual time, and typical signs were found post mortem. In one pup of about three months of age death occurred from intussusception. When a single large dose, or a series of doses is given over a short period, the effect upon the serum calcium can be observed for several days. There is a gradual rise to a maximum and then a gentle decline to normal or below. The initial fall in the serum calcium has been remarked upon elsewhere. See Fig. 1.

Subcutaneous.—Perhaps the most interesting phenomenon associated with this mode of administration is the fact that irradiated ergosterol is much less effective, in so far as the hypercalcæmia and other signs of overdosage are concerned, when administered subcutaneously. The first adult animal which was treated by subcutaneous injection received 1 c.c. doses twice daily for 16 days before the signs of over dosage appeared and death occurred. The usual signs in the gastro-intestinal tract characteristic of overdosage were then found. In another experiment six pups of approximately 2½ months of age and weighing about 2 kilos were divided into three pairs. The first pair was given 0.5 c.c. of irradiated ergosterol daily by mouth. The second and third pairs were given 1 c.c. intramuscularly and subcutaneously respectively. Those receiving the material by mouth lost weight rapidly and died in 5 and 8 days respectively. The pair receiving 1 c.c. doses by subcutaneous injection survived for 12 and 18 days respectively. The reduced susceptibility of the latter animals was in reality greater than the lengthened survival time implies, since they were very late in showing any symptoms whatever of overdosage. Even after a week or more of treatment they appeared bright and lively, whereas the animals which received the substance by mouth showed the characteristic symptoms within 48 hours. Though the possibility was considered, there was no indication, nor is there any reason to believe, that the relative ineffectiveness of the material in these instances was the result simply of non-absorption. To test this point specifically 20 c.c. of corn oil were injected beneath the skin. The swelling resulting from the injection had completely disappeared within a few hours. The animals receiving the irradiated material in the muscles of the thigh also were more resistant than those which received it orally, but were no less so than those into which it was injected subcutaneously. A single maximal dose by mouth in many instances

* After this paper had been written our attention was drawn to the communication of Reed and Thacker[70] in which the toxic effects of the intravenous injection of ergosterol were reported.

produces a greater effect upon the serum calcium than a series of such doses given subcutaneously or intramuscularly. The initial fall in the calcium curve was very pronounced in the animals receiving the doses by the subcutaneous and intramuscular routes. A drop of from 1 to 3 mg. occurred and the subnormal level persisted for from 2 to 3 days. In rabbits we have found that subcutaneous injections of irradiated ergosterol extending in some instances over a period of weeks are ineffective, whereas when the material is given by mouth, the symptoms of overdosage have appeared at the usual time. We have had no experience with the intramuscular administration of the sterol to these animals. Smith and Elvove have stated, however, that oral and intramuscular administration are equally effective. But, in examining the figures of these investigators, some indications of a greater effect upon the serum calcium by oral than by intramuscular administration were found when the dosage in both instances was comparatively small (0.5 to 2 mg.). The loss in weight was less when the intramuscular route was employed, though the total dose was larger. A rise in the serum calcium of from 20 to 25 per cent was caused by the administration of 0.5 mg. by mouth for 30 doses, whereas 1 mg. given intramuscularly over the same period was followed by a fall of from 3 to 16 per cent in the serum calcium. This depression in the serum calcium is suggestive in view of our own findings recorded in the first part of this paper, that the first effect of the administration of excessive doses of irradiated ergosterol is a lowering of serum calcium.

What is the explanation for the fall in the serum calcium? Does it indicate the passage of calcium from the blood into the solid tissues, *e.g.*, the bones? We believe this to be the most probable explanation. This view is consonant with several observations relating to the action of vitamin D in physiological dosage. Taylor and Weld[34] have found that irradiation of the body surface or the administration of small doses of the sterol invariably causes a decrease in serum calcium.

The relative refractoriness of animals to the subcutaneous administration of irradiated ergosterol is an observation which possibly is not without physiological significance. Natural foods are poorly supplied with the antirachitic vitamin. The latter is produced presumably, *in vivo* as *in vitro*, from its precursor, ergosterol, by the action of ultra-violet light. In the animal body this action can only take place in or upon the skin. Hence the latter is believed to be the main route by which the vitamin enters the body under natural conditions. It is perhaps not too speculative to suggest that any vitamin entering the body by the cutaneous route in unnecessarily large amounts as a result of over-irradiation of the body surface may be stored in the subcutaneous or intramuscular tissues. Or it may be that some mechanism exists in these situations whereby quantities of vitamin excessive to the body's needs are rendered inert. We have in the pigmentation of the skin a mechanism allied to that suggested which shields the deeper layers of the skin from injury by over-irradiation with ultra-violet light. The latter mechanism alone, however, could not protect against the absorption of ergosterol secreted and irradiated upon the surface of the skin or in the layers of the epidermis superficial to the pigment layer.

Inunction.—We have found that irradiated ergosterol administered by this means acts in the same way as by subcutaneous injection.

DISCUSSION

We have offered, we believe, substantial evidence for a close association between the action of *large* doses of irradiated ergosterol and parathyroid function. The nature of this association may possibly be other than the one which our experiments have suggested to us, namely, a direct stimulation of parathyroid tissue by the vitamin.* We also admit that

* Our experiments furnish no evidence that vitamin D, or irradiated ergosterol, in *small doses* stimulates the parathyroids. It very well may be that parathyroid function comes into play as a compensatory mechanism to withdraw calcium from the bones and increase the excretion of calcium only when an abnormal amount of the vitamin enters the body. The evidence points to small doses of irradiated ergosterol having an action contrary to that of excessive doses. The former cause the deposition of calcium in the bones, a fall in the serum calcium and a positive calcium balance. The latter decalcifies the bones, induces hypercalcæmia and a negative calcium balance. We can only compare the excessive dosage of ergosterol with large doses of parathormone. Little is known of the effect of small doses of the latter substance. Whether or not these can cause an increase in calcium retention and a deposition of this mineral in the bones is unknown. Whether the parathyroids are concerned in the etiology of rickets is also

Footnote continued on page 27

the final and direct proof of our contention has yet to be furnished. The fact that many animals possess accessory parathyroid tissue is the chief difficulty in the way of deciding the question by direct experiment. Though we have attempted to overcome this difficulty by making a free dissection of the neck tissues, the experiments are not as conclusive as we would desire. The duration of life has been greatly prolonged when the complete operation has been performed. Nevertheless, on account of the number of variables, age, diet, weight, etc., which must be controlled, the results of a large number of experiments would be required before a truly decisive conclusion could be arrived at.

The findings (a) that tetany is so very promptly relieved by irradiated ergosterol in an animal from which the thyroparathyroid apparatus alone has been removed, and (b) that an animal upon which the complete operation has been performed fails to respond to the treatment, provide, we think, important evidence that parathyroid tissue is concerned in the reaction of the body to ergosterol overdosage. The only explanation which we can offer for the development of any overdosage effects at all in the animals upon which the complete operation had been performed, but which did not develop tetany, is the same as for the fact that the serum calcium did not fall to the tetany level in these animals after the operation, namely, that parathyroid tissue exists in inaccessible regions, such as the thorax. Unfortunately, anatomical studies which might inform us of the extent to which accessory parathyroid tissue is possessed by various species have not been exhaustive. Reports of a number of investigations upon this question can however, be found in the literature.

To-day the view seems to be very commonly held that parathyroid function is served practically exclusively by those parathyroid glands found in close association with the thyroid. This appears to be far from the truth and the observations of those most conversant with this field of investigation are directly opposed to such a view. So general is the former conception, however, that the practice of invoking the possible existence of accessory parathyroid tissue in order to explain otherwise intractable experimental results is looked at askance. Yet the evidence at our disposal is sufficient for us to decide with certainty that the four discrete collections of parathyroid tissue generally known as the parathyroid glands are, in a large proportion of animals at any rate, merely a part of the parathyroid apparatus. Even of these glands, only one pair may have such a close relation with the thyroid that they are removed when the latter gland is ablated. The performance of a parathyroidectomy or even of a thyroparathyroidectomy and the study of the effects of this presumably complete operation appears to be a simple and clear cut experi-

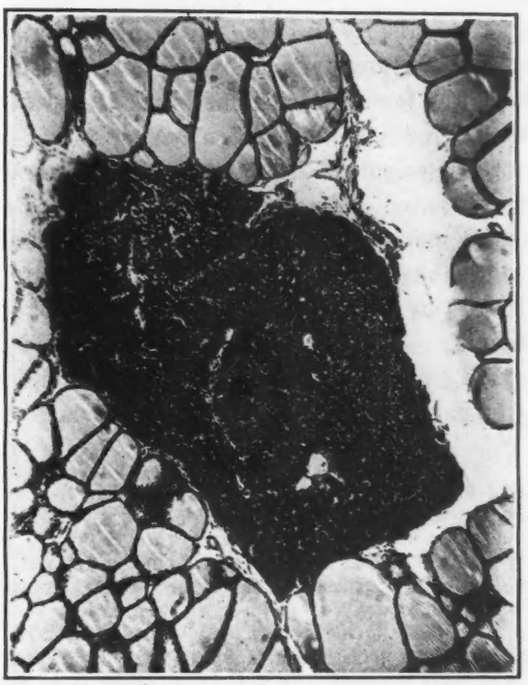

FIG. 4.—Section from dog (No. T11) showing a parathyroid gland surrounded by thyroid tissue. We are indebted to Prof. E. A. Linell for taking this microphotograph.

a question which cannot be definitely answered. Erdheim,[71] it may be recalled, reported hyperplasia of the parathyroids in rats suffering from rickets. He also found defective calcification of the teeth and bones of these animals after parathyroidectomy. Iselin[72] observed osseous changes resembling rickets in parathyroidectomized rats. Erdheim's findings were criticized by Korenchevsky[73] on the ground that the vitamin content of the diet was unknown. The latter observer was unable to duplicate Erdheim's results but produced rickets in rats with diets deficient in vitamin D. Others since, however, have experienced great difficulty in producing rickets in these animals by deficiency in vitamin D alone, and there is no reason to believe that the diets used by Erdheim were otherwise rachitogenic. It may be mentioned that Pappenheimer and Minor[74] and Ritter[75] have described hyperplasia of the parathyroids in human rickets.

ment. Yet as a matter of fact, unless serial sections of the tissues of the neck and thorax be made at autopsy, any conclusion concerning parathyroid function which is based upon the assumption that all parathyroid tissue has been removed must be invalid, since it is never possible to know that active parathyroid tissue has not been left behind. In the dog it has been our experience that the parathyroids associated with the thyroid may be of almost microscopical size and unable to be detected at operation (they may be embedded in the thyroid; see Fig. 4), and the only way to remove these with certainty is to remove the latter gland. Even then, the lower pair may be aberrant and left in place. Conversely we have found that in the dog or cat it is utterly impossible to remove the thyroids alone and leave the minute upper pair of parathyroids, or the lower pair, if these are in close relationship with the thyroid, undisturbed. Sandström,[76] the discoverer of the parathyroids, believed that, though man possessed two pair of glands, cats and dogs had only one pair, since in all the individuals of the latter species which he had examined only the upper or internal pair were found in association with the thyroid. It will also be recalled that Gley,[77] who first demonstrated the physiological importance of the parathyroids, was able to furnish the final proof of this importance by showing that in the rabbit the lower pair of parathyroids lay below the thyroid lobes and often hidden from view by adjacent structures. Their presence was revealed in many instances only after a careful search had been made. Prior to Gley's work rabbits were believed to enjoy an immunity to tetany not possessed by other animals. Gley's predecessors in this field had formed this opinion from animals in which the lower pair of glands had not been removed.

Gley also reported finding tissue in the dog in excess of that represented by the glands of Sandström. Vassale and Pianca[78] found accessory parathyroid tissue extending into the thorax. Forsyth,[79] who made very careful studies in a large number of human subjects and in various animal species, states that the parathyroids vary very widely in anatomical position and in number. One person may have 10 or 20 times the amount of parathyroid tissue possessed by another. In mammals generally, as well as in birds, these glands were found to occupy no constant position, but the superior pair of glands were more usually found in the expected situation. Forsyth after a searching histological examination of the structures of the neck found 1, 8 and 1 collections of parathyroid tissue, respectively, in three green monkeys. A fruit bat, on the other hand, possessed 10. He concludes that parathyroid tissue may be found anywhere from the jaw to the interior of the thorax. Moussu[80] reported finding a parathyroid attached to the submaxillary gland. Collip[123] found one in the centre of a lymph gland near the angle of the jaw in a sheep. They have also been observed in lymphatic glands and in the thymus by Forsyth. In several of the animals of our series only two parathyroids could be found in the extirpated thyroids. In one animal none was found in the latter though a careful histological search was made. Greenwald and Gross[13] state that the majority of dogs possess accessory parathyroid tissue. Marine[81] observed parathyroid tissue in the thymus in 6 per cent of dogs. Harvier[82] found it so situated in 50 per cent of cats. Nicholas and Swingle[83] found accessory parathyroid tissue in the thymus in 35 per cent of cats, Shapiro and Jaffe[84] in 12 per cent after a routine examination of merely a single section removed from the thymus of each animal, and Farner and Klinger[85] discovered it in the thymus of practically every cat in which a serial section of the gland was made. The presence of parathyroid tissue was demonstrated in the thymus of all the rabbits (twenty) examined by Haberfeld and Schilder.[86] Cowdry[87] states that parathyroid tissue may be found lying against the œsophagus or in the thorax. From the close embryological association of the parathyroids and thymus it is not surprising that accessory parathyroid should be found so frequently in the latter situation. Even the lower pair of parathyroids may be in this situation in adult life, having become included and dragged down with the thymic anlagen. Klotz[88] discovered an accessory gland at the tracheal bifurcation, and in the neck of one dog 12 separate collections of parathyroid cells were found. Horsley[89] removed the thyroids in young monkeys and described convulsive seizures and other nervous manifestations which we know now were due to parathyroid deficiency. Forsyth, it has been mentioned, found in the green monkey the parathyroids associated with the thyroid to be very variable in number. Swale Vincent[90] states that, though he made a thorough search for parathyroid tissue in thyroidectomized monkeys, none was discoverable. These results are pertinent to Hess's experiment upon a monkey already referred to in which ergosterol, though effective as an anti-tetanic agent before operation, had no appreciable action after parathyroidectomy. Adami and Nicholls (quoting Freedman)[91] found in the human subject "a very wide variation both in the number of parathyroids in normal relationship to the larger gland (thyroid) and in the accessory parathyroids."

The variability in the development of tetany after parathyroidectomy is also best explained by the inconstancy of the parathyroids. We have found, as have many others, that it is never possible to predict the time of onset or the severity of tetany in dogs after thyroparathyroidectomy. Twenty-four, 48 or 72 hours may elapse before convulsions ensue. In other animals only mild symptoms appear, such as twitchings and stiffness of the hind limbs. Not uncommonly the animal remains quite normal. In cats the proportion which develops tetany is much smaller. In fact in our experience it is unusual to see severe tetany develop in these animals. The serum calcium shows as a rule a very moderate drop. Ed-

munds[92] removed four parathyroids from each dog in a series of nine. Three animals died within a week, one in 4 weeks and five survived. Adami and Nicholls[91] quote Shepherd, who had a large experience, as stating that he had never observed tetany to follow a complete thyroidectomy in the human subject, yet it was well known at that time that this accident did occur, and cases of post-operative tetany were being recorded in various parts of the world. It must also be admitted that in only a small proportion of the patients upon whom Kocher[93] and Reverdin[94] performed a complete thyroidectomy did tetanic seizures develop. The obvious conclusions to be drawn from these observations upon the development of tetany in animals and man is that the variability of the onset and severity of the condition depends upon the variable amounts of parathyroid tissue possessed by the different species and by different individuals of the same species. This variability which we refer to is quite independent of age, sex, diet or any other known difference.

The similarity between the effects of ergosterol overdosage and those of hyperparathyroidism, so far as these have been investigated and recounted in the present paper, is undoubtedly remarkably close, and this evidence alone makes it extremely probable that the irradiated sterol in large doses exerts its toxic action by a mechanism which calls parathyroid function into play. (Table VII). We are not unaware, however, that comparisons of the actions of two agents, no matter how closely parallel these actions may run, can lead to a fallacious conclusion. For instance, it is comprehensible that some single physiological reaction might be common to two quite independent and distinct substances. This reaction might then be the starting point for an inevitable train of disturbances. It might be argued on such grounds that the diverse effects resulting from overdosage were simply the result of the hypercalcæmia, and that mobilization of calcium from the bones was the key factor. It has been pointed out that irradiated ergosterol and parathormone have this latter action in common. Yet, though thyroid extract and acids,[15, 54, 95] cause decalcification of the bones, these agents do not cause the other manifestations characteristic of overdosage with parathormone or irradiated ergosterol.

On the other hand, Caven and Taylor[96] found a moderate hypercalcæmia, unaccounted for by blood concentration, after adrenalectomy. This has been confirmed by Rogoff and Stewart.[97] Adrenal deprivation in animals is also associated with gastro-intestinal lesions of a hæmorrhagic and ulcerative nature. Yet there is no evidence that the calcium rise in this condition has any causative relationship with the gastro-intestinal condition. Furthermore, though we have found in our experiments with ergosterol that hypercalcæmia is an index of overdosage and is always pronounced at some time during the course of a fatal case it should be looked upon as an associated phenomenon and not the primary one. In some instances the serum calcium has been very high for weeks and no gastro-intestinal changes have been found after death. In other animals, though the calcium has been high in the early stages of poisoning, it has been normal or not greatly elevated for some days before death. It has moreover been shown by others, Salveson,[98] Collip,[25] and Taylor and Fine,[16] that large quantities of calcium may be injected intravenously, and, after a transient hypercalcæmia, the serum calcium rapidly falls again to normal and no untoward effects are induced. It must be mentioned, however, that Collip has reported toxic effects simulating parathyroid overdosage by the combined injections of phosphorus (acid sodium phosphate) and calcium. The question then naturally arises are the manifestations of overdosage with irradiated ergosterol due to a combination of hypercalcæmia with hyperphosphatæmia. We cannot believe that this is the correct explanation. A rise in the inorganic phosphorus of the blood is preceded, often by several days and in the long period experiments by weeks, by symptoms of the gravest nature; or the phosphate may be subnormal while diarrhœa, loss of weight, weakness and other signs of overdosage are pronounced.

In connection with the question of an interrelationship between vitamin D and the parathyroids it may be mentioned that fish, the only class of vertebrates which does not possess parathyroid glands,[87] are also exceptional in having relatively enormous supplies of vitamin D in their livers. This fact, in our opinion, is significant.

Another possibility to be considered concerning the association of the actions of the two substances is that irradiated ergosterol and parathormone act in common upon some endocrine or other organ. The greater susceptibility to ergosterol of normal animals as compared with those deprived of parathyroid tissue militates against this possibility.

Morgan and Garrison[18] observed that vitamin D rendered animals (dogs) more susceptible to overdosage with parathormone. Animals on vitamin D deficient diets were stated to be tolerant to parathormone administration. This has not been our experience, though it is well known that a certain proportion (Collip, Aub *et al.* and Moritz) of dogs for some unexplained reason are resistant and apparently immune to ordinary doses of the hormone. This is particularly true if the doses are small to start with and are gradually increased. As mentioned elsewhere, a similar tolerance to ergosterol overdosage has been observed in some animals.*

The results of Morgan and Garrison[18] would at first sight suggest that ergosterol and parathormone were complementary to one another in their actions in a manner similar perhaps to the interaction of an enzyme and its co-enzyme. We believe however that the apparent susceptibility to parathormone of dogs given irradiated ergosterol is simply the result of an additive effect of the two agents. From our experience with the actions of the two substances this appears to us to be the most probable explanation. An experiment which we performed supports this view. Two animals of approximately the same age and weight were given daily 0.5 c.c. of irradiated ergosterol and 20 units of parathormone respectively. To a third animal the same doses of the two agents, each on alternate days, were given. The survival period and the general development of the symptoms were not significantly different in this last animal from those observed in the other two.

In a communication appearing while our first paper was in preparation, Jones, Rapoport and Hodes[19] reported that when hypercalcæmia was produced by the administration of irradiated ergosterol for a period of two weeks, and parathyroidectomy then performed, there followed a milder type of tetany than that which developed in parathyroidectomized animals that had received no ergosterol. Irradiated ergosterol treatment when continued after operation sustained the serum calcium level above normal, and so long as this was so tetany did not recur. In animals to which irradiated ergosterol was given for the first time after operation the course of tetany was favourably influenced. The animals of the latter series received calcium in the form of milk, so it is not possible to decide that the vitamin had been the determining factor in the relief of the symptoms. When the administration of the sterol was continued in these parathyroidectomized animals, and the serum calcium determined over a period of several weeks, hypercalcæmia was observed. These investigators therefore have concluded that stimulation or hyperplasia of parathyroid tissue cannot be concerned in the action of irradiated ergosterol. This conclusion was supported by their observations upon the general symptoms of normal animals receiving excessive doses. They state that concentration of the blood, vomiting, diarrhœa, weakness, etc.—characteristic features of parathyroid overdosage — were not observed. The only explanation which we can offer for these results is that the doses of irradiated ergosterol employed by these observers were much smaller than those employed by us. Bauer and Marble[20] have also come to the decision that irradiated ergosterol does not act through the parathyroids. They found that the bone trabeculæ of cats when reduced in number by calcium starvation were regenerated to a greater extent later when calcium and ergosterol were fed together than when calcium was given alone. This implies that calcium deposition is favoured by the sterol, whereas parathormone is known to cause decalcification. In these experiments small doses (therapeutic) were given, and such an action of small doses is freely admitted. The action of large doses is however quite another matter. These undoubtedly have an opposite effect. In Fig. 5 is a diagram which illustrates our conception of the movement of

* We know of no experiments in which the administration of parathormone was continued for a long period after tolerance had become manifest. It would be interesting to see whether there would follow slow metabolic disturbances, similar in nature to those observed by us in certain dogs (Nos. 5 and 8) which showed a tolerance to irradiated ergosterol so far as the acute manifestations were concerned.

calcium under the influence of either parathormone or of large doses of irradiated ergosterol on the one hand and of small doses of the sterol on the other. The fall in the serum calcium observed by us after the administration of small doses to normal animals, the deposition of calcium in the bones, and the reduction

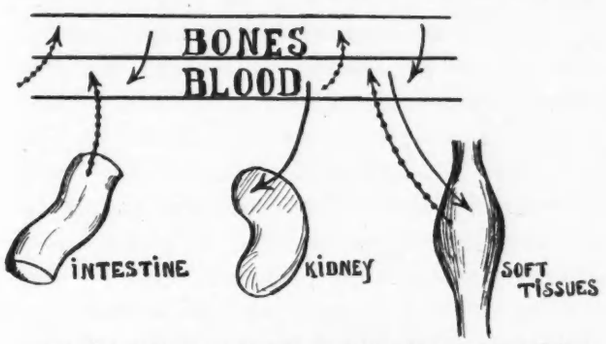

FIG. 5.—Diagram comparing the effects upon calcium metabolism of small doses of irradiated ergosterol with those of excessive doses of this substance or of parathormone.

◆—◆—◆—◆→ = Small doses of irradiated ergosterol.
——→ = Excessive doses of irradiated ergosterol or of parathormone.

in the negative calcium balance as rickets is healing,[99, 100] as well as the precipitation of tetany at this stage in the rachitic process, are among the observations which support our conception.* Ultra-violet light also converts a negative calcium balance in lactating animals to a positive.[104] In non-lactating animals on calcium deficient or on high calcium diets the value of a positive calcium balance is increased by irradiation.[105, 106] The action of excessive doses of irradiated ergosterol upon the calcium balances of normal dogs and the effect of irradiation with ultra-violet light upon the serum calcium have been mentioned.[34, 124] It is the reversal of the sterol's action leading to the withdrawal of calcium from the skeleton when given in excess which has been such a confusing feature in the study of this substance. Bauer and Marble speak of irradiated ergosterol "in therapeutic doses". This and "prophylactic doses" are terms in common usage. It is from these expressions that a very practical question arises. Surely the dosage at which calcium retention and the deposition of calcium in the bones are optimal should be a basis for the determination of the quantity to be given therapeutically. There is little evidence—and our experiments furnish none—to suggest that the parathyroids are stimulated by doses below this level. A dose above this would obviously be of less curative value, and still larger doses, even though not noticeably detrimental, would nevertheless produce an effect upon calcium metabolism which would be undesirable. The magnitude of the dose at which the reversal of action occurs is unknown. Experiments are in progress by which we hope this may be determined.

Beyond the studies of the investigators cited in the foregoing paragraphs there are few reports in the literature of the action of excessive doses of irradiated ergosterol upon dogs or cats, the species of laboratory animal which more closely resemble the human, in so far as calcium metabolism is concerned, than any other. Of those who have employed these animals, with one or two exceptions, none has observed that irradiated ergosterol had any particularly toxic action. Kreitmair and Moll[61] studied the toxic effects in a number of different species and reported upon dogs incidentally, stating that

* It might be expected that tetany would be relieved only when the dosage had reached the magnitude at which the parathormone-like action came into play. Our experiments indicate that this is so, and the failure of others to demonstrate that irradiated ergosterol rapidly cures tetany is probably for the reason that the dosage employed had not been sufficiently great. It may be recalled that several observations reported in the past suggest that small amounts of vitamin D are more likely, at first, to precipitate a latent tetany than to cure the manifest condition. Huldchinsky[101] reported that ultra-violet light had this effect. Stheeman and Arntzenius[122] were among the first to point out that though in florid rickets there was a normal serum calcium value this might become lowered during the healing process. Bakwin, Bakwin and Gottschall[102] employed cod liver oil for the cure of tetany but found it ineffective relatively to irradiated ergosterol. In several of their patients the serum calcium level was either unaltered or actually lower after a week or more of treatment than before this was instituted. Large daily doses (4 mg.) of irradiated ergosterol on the other hand, abolished the muscular hyperexcitability within a few days, the serum calcium having risen above the tetanic level. Swingle and Rhinhold[6] employed ultra-violet light for the relief of tetany in parathyroidectomized dogs. An ameliorative effect, but not a permanent cure, followed this method of treatment. The serum calcium was not elevated and in some animals it was lower after than before irradiation. Gerstenberger, Hartman, Russell and Wilder[103] have reported the development of tetany as a result of ultra-violet irradiation, but lay emphasis upon the intermittent nature of the antirachitic treatment in the causation of spasmophilia. These observations taken in conjunction with data given in the present paper have furnished substantial aid toward the development of the idea that small doses of vitamin D, whether as irradiated ergosterol or as cod liver oil, cause an effect upon the movement of calcium in relation to the bones, blood and soft tissues, opposite to that of excessive doses.

death occurred after excessive dosage. Cartland, Speir and Heyl,[107] experimenting upon two dogs, have neverthless obtained results directly opposed to our own. They reported that a dose 1,000 times the antirachitic requirement for this species was innocuous.

Conclusions regarding the action of irradiated ergosterol have been drawn mainly from experiments upon rats or other species of rodents. These species have been found highly resistant to the toxic action of the sterol. They are, as we have shown, also practically immune, or at any rate so resistant to parathormone that the unit bulk of this material precludes the possibility of producing an effect by an amount which could be considered within physiological limits. *Dogs, on the other hand, react to parathormone in doses of the same magnitude as those which influence the calcium and phosphorus metabolism of the human subject.* Collip and Leitch[108] found that the dose of the hormone necessary to cure infantile tetany was of practically the same magnitude as that required to relieve the symptoms of parathyroidectomized dogs. Hoag and Rivkin[109] found that the number of units required to elevate the serum calcium of the human subject was essentially the same as that employed to raise the serum calcium in the dog. Hunter and Aub[30] observed a serum calcium of nearly 20 mg. per cent and a pronounced elevation of the phosphorus and non-protein nitrogen of the blood after the administration of 120 units of parathyroid extract and calcium lactate to a patient over a period of six days. Petty, Stoner and Schaffer[114] observed a very high serum calcium in adult human subjects who had received parathormone in doses comparable with those which cause hypercalcæmia in dogs. Nausea and vomiting were, in several instances, associated with the elevation of the serum calcium. Though the evidence which we have furnished in this regard is indirect, it has led us to more than a suspicion that irradiated ergosterol acts in the same way upon the calcium metabolism of the human subject as it does upon that of the dog, and that the toxic dose in the two species is comparable. Nor is direct evidence of this similarity of action and magnitude of dosage wanting. Hess and Lewis,[7] in 1928, recorded the following observations upon infants receiving irradiated ergosterol in "therapeutic" doses— "After this infant had received about 5 mg. of irradiated ergosterol for a period of a little over three weeks, it developed a moderate fever and began to lose weight; in the course of twelve days it lost 2 pounds (0.9 kg.). There was some vomiting, marked drowsiness and a *peculiar mental condition.** The calcium rose to 16.2 mg. per hundred cubic centimetres and persisted at a high level, although the phosphorus percentage remained about normal. The other instance which manifested abnormal symptoms was similar, in that there was loss of weight accompanied by fever and peculiar drowsiness, a clinical picture reminding one of dehydration. It is difficult to interpret this clinical phenomenon. . . Possibly these children were peculiarly sensitive to the action of irradiated ergosterol. In fact, one of them began to develop similar symptoms for a second time. . . . In spite of the hypercalcæmia, the steady gain in weight continued until the twenty-fifth day, when the infant began to lose weight and vomited once. The calcium in the serum was found to be 17.6 mg. per hundred cubic centimetres." This description of the symptoms following the administration of large doses of irradiated ergosterol to infants might be used equally well to depict the early effects of overdosage which we have observed in dogs. Often the most striking of the early signs of overdosage with either ergosterol or parathormone are a strange apathy and a change in the behaviour of the animal which, though difficult to describe in a word, are quite definite and unmistakable to one who has seen them a few times.

The action of irradiated ergosterol has offered great opportunities for the study of certain problems in calcium metabolism and though our findings are mainly of physiological interest they are not without a practical bearing. They show that in a dosage which does not exceed so very much that which is used therapeutically, irradiated ergosterol possesses great possibilities for harm. The harmful action, so far as clinical interest is concerned, has been obscured by the results of the administration of the sterol to insusceptible animals. The general tenor of the writings in the recent literature, with a few exceptions, is to the effect that irradiated ergo-

* The italics are ours.

sterol, except in relatively enormous doses, is harmless. To quote Dixon,[110] "Certain preparations of irradiated ergosterol given to rats which are being fed on a synthetic diet act as a poison, but if the rats are fed on bread and milk the effect of the ergosterol is negligible. In real life we do not live on a completely synthetic diet. . . . So the practical value of this type of experiment may be overestimated, though it is of considerable academical interest." Similar views have been recently (1929) expressed by Hess, Lewis and Rivkin.[111] "Too much", they say, "has been made of these studies." Light, Miller and Frey,[56] in view of their experiments upon rats, have suggested that for the infant "the harmful dose would be 1.5 litres per day of a solution of irradiated ergosterol in oil 100 times as potent as cod-liver oil."

Harris[40, 117] has also pointed out that the calcium phosphorus ratio of the diet is a most important factor in the development of toxic features in rats. He found that the effects were greatly intensified by adding calcium phosphate to the diet. Bills and Wiricke[38] have shown a similar susceptibility of rats fed calcium carbonate. Harris[117] would allay the fears of overdosage in these words "the quantity of vitamin D which proves toxic to a rat. . . . is some 100,000 times an adequate physiological dose. The toxic dose varies somewhat from one species to another but there should be little practical danger to humans of ill-effects from excessive vitamin intake." In our experiments the animals were upon a normal diet. Toxic effects, resulting in death, were induced in pups on relatively small doses—from 10 to 20 times the therapeutic dose per kilo — when a diet of whole milk and bread and adequate in the other vitamins was fed.* Death was also caused in adult dogs placed upon a calcium deficient diet, though as mentioned elsewhere, the symptoms were as a rule slower in their development when the calcium intake was low. On the other hand the observations of Hess, Poncher, Dale and Klein[113] upon the effects of excessive doses of irradiated ergosterol given to infants would appear to pronounce that clinically this substance is free from a harmful action. The daily amount of viosterol (100 D) which these investigators found it necessary to give for therapeutic purposes was in some instances as much as 60 drops. The amounts given for the purpose of determining whether or not irradiated ergosterol possessed a toxic action were equivalent to from 210 to 525 drops of 100 D, that is, from 3½ to 8¾ times the maximal therapeutic dose which these authors employed. The latter figure indicates a somewhat lower dosage than we have found to be lethal for young animals. In a very large proportion of those puppies of our experiments which succumbed in the early stages of treatment, that is before loss in weight and metabolic disturbances became very prominent features, intussusception of the bowel was found at autopsy. Julius Hess *et al.* have stated that in two-thirds of the infants to whom excessive doses were given, severe colic, often of a most intractable nature, was a prominent feature. These observations suggest to us that possibly the dose administered to these infants was not far from the danger line. Beyond the high incidence of severe colic there were no other significant features in the group of infants treated by large doses. Hypercalcæmia was absent. The gain in weight was continuous though decidedly less in the treated group, at least for the first three months, than in the control group.

* The results of these experiments, which comprise a large number of animals, will be reported in detail in a subsequent communication.

SUMMARY

1. This paper gives a condensed account of a number of experiments from which fresh evidence has been derived for a close relationship between the overdosage effects of irradiated ergosterol and parathyroid function. This relationship is thought to be most probably, a direct one, namely, the stimulation of parathyroid tissue by the sterol.

2. Death of adult dogs follows the administration of irradiated ergosterol when the amount given per kilo has a greater potency than 20 times that of the maximal therapeutic dose. Puppies show a greater susceptibility to overdosage than full grown animals.

3. The symptoms and post-mortem findings in the blood following overdosage with irradiated ergosterol are indistinguishable from those resulting from the administration of lethal doses of parathormone. The chemistry of the

blood, in so far as this has been investigated, is affected in an almost identical manner by either substance.

4. The effects of excessive doses of irradiated ergosterol upon calcium and phosphorus metabolism run closely parallel with those resulting from parathyroid overdosage.

5. It is pointed out that those species which show a high resistance to the toxic action of irradiated ergosterol are tolerant to a corresponding degree to the action of parathormone. Since the dog and the human subject are, as contrasted with other species, highly susceptible to the hormone, it is suggested that the human subject may share with the dog a hugh suceptibility to irradiated ergosterol. Clinical observations are cited as direct evidence for the latter view.

6. Our experiments and those of others indicate that, upon increasing the dosage of irradiated ergosterol from small to very large amounts, its effect upon calcium metabolism becomes reversed, a parathormone-like action becoming manifest. The precise level of dosage at which the reversal of action occurs is unknown.

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FRACTURES AND DISLOCATIONS OF THE SPINE

A Review of Fifty Consecutive Cases

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TO the public, a broken back is a terrible injury, and a broken neck a tragedy. These feelings are shared by many practising physicians, who associate fractures and dislocations of the spine with either sudden death or life-long invalidism. They picture the bed-ridden patient with paralysis of lower limbs and incontinence of urine and fæces, dragging out a miserable existence from which death is a welcome release. But this gloomy picture represents only a small percentage of those who have had a fracture or dislocation of the spine. Indeed, it is not uncommon for such an injury to occur as the result of a very slight trauma; or to find the victim wandering about for months with his condition undiagnosed; or, what is more serious, to discover him lying in a hospital bed receiving no adequate treatment. Such considerations have prompted this paper, in which will be presented a review of fifty consecutive cases, stressing some points in the diagnosis, prognosis, and treatment which the writer believes should be better understood by all those who hold themselves in readiness to render aid or give advice when an accident occurs. Patients with fracture of the transverse processes only are not included in this summary, because they present quite different problems.

Forty-five of these 50 patients were males and 5 were females. The youngest patient at the time of the accident was 9 years of age, the oldest 68. The patients were examined at varying periods after the accident, from 2 hours to 25 years. Forty-three of them were living when last heard of. Seven are known to be dead. Of these, 2, both with fractures in the cervical region, died soon after the accident of shock or exhaustion; 2 are listed as operative deaths following laminectomy of the cervical spine; 2 succumbed to urinary infection, and 1 to sepsis following a fusion operation upon the spine. (Table I).

Table I

Fracture or Dislocation of Spine—50 Cases
(not including transverse processes)

Sex:	Male 45	Female	5
Age at time of accident:		Oldest	68
		Youngest ..	9
Mortality:	43 are living.		
	7 are dead.		
Cause of Death:	Shock and exhaustion		2
	Following laminectomy		2
	Urinary infection		2
	Sepsis following fusion operation		1
			7

It is well known that when enough violence is applied to the human body to produce a fracture or dislocation of the spine the lesion is most frequently near the thoracico-lumbar junction, the next most common site being in the cervical region, while fracture of the thoracic spine above the 11th thoracic vertebra is of infrequent occurrence. Fig. 1 shows the distribution of the lesion in our 50 cases. In 12, it was in the cervical spine; in only 4 in that part of the thoracic spine above the eleventh thoracic vertebra; in 28, in the "thoracic-lumbar region"; (between the 11th thoracic and the 2nd lumbar inclusive), and in 6, below the second lumbar vertebra. (Table II).

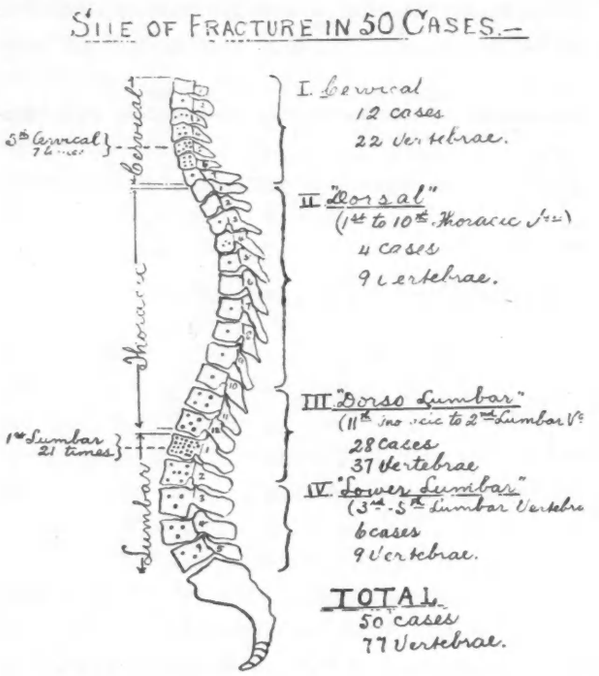


FIG. 1.—Location of fracture of dislocation in 50 cases. A dot has been placed on the body of the vertebræ for each time it was involved. Of the 77 vertebræ involved, 21 were first lumbar.

TABLE II

SITE OF FRACTURE

Cervical	12
"Thoracic" (above 11th. Thoracic)	4
"Thoracico-Lumbar" (11th Thoracic to 2nd Lumbar)	28
Lower Lumbar (below 2nd Lumbar)	6

NATURE OF THE ACCIDENT—MECHANISM

One sees frequent references to the increased number of serious fractures resulting from the newer methods of transportation. It is interesting to note that in the case of only 10 of our patients, could the accident be attributed to motor cars; while 19 were injured by horses or horse-drawn vehicles, 2 by trains, and 2 by handcars. A fall from a height was responsible in 14 patients, most of whom have to be listed as victims of industrial accidents (Table III).

TABLE III

NATURE OF FRACTURING FORCE

Motor cars	10
Horses of horse-drawn vehicles	19
Locomotives	2
Fall from height	14
Crushed by falling material	6

It is the writer's opinion that fractures of the spine are not much more common than they were 20 years ago, but that they are more frequently recognized since the newer aids in x-ray diagnosis have come into general use. It is not the motor car so much as the Potter-Bucky diaphragm that accounts for the increased number of case reports of fracture of the spine in the literature.

In the cervical group, the mechanism appears to be force applied to the head, when the neck is partly flexed. (Table IV). Only one of our series of 12 received his injury diving into shallow water. Three fell from a height, alighting upon the head, and 3 were thrown from fast-moving vehicles. One had cord wood fall upon him, striking the head, and another was kicked on the head by a horse. One fell down an embankment head first, 1 was sandwiched between two handcars, and 1 was doubled forward and run over by a wagon. In only 2 of the 12 was the motor car responsible, while the humbler horse has to accept the blame in 6 cases.

TABLE IV

FRACTURING FORCE IN 12 CERVICAL CASES

Fall—alighting on head	3
Thrown from auto, or plough	3
Diving into shallow water	1
Hit on the head by (a) falling cord wood (b) kick by horse	2
Fell down embankment head first	1
Sandwiched between two hand cars	1
Doubled forward and run over by wagon	1
	12

Horses 6. Autos 2.

Mechanism: Force applied to head with neck flexed.

No common etiological factor is discernible in the histories of the four patients classified as "thoracic cases". It would appear that the ribs protect this region during forcible flexion of the spine, so that the break occurs elsewhere, usually in the thoracico-lumbar region. Indeed, there must be an element of direct violence to produce a fracture in this region. Only one of these 4 patients fell from a height (a distance of 28 feet in his case). Probably he alighted on his back. Another was injured when the car in which she was riding turned over on the road. She was not thrown out. The third had his clothing caught in a machine and was drawn into it; while the fourth was buried by bags of flour that fell upon him from a crane. (Table V).

Table V

Fracturing Force in 4 "Thoracic" Cases

Fall from height (28 feet)	1
Auto turned over (not thrown out)	1
Clothing caught and drawn into machine ..	1
Buried by bags of flour falling from a crane	1

Mechanism: Probably direct violence.

In the thoracico-lumbar region, force applied so as to flex the whole spine is the common mechanism (Table VI). Just half of our 28

Table VI

Fracturing Force: 28 "Thoracico-Lumbar" Cases

Fall from height (3 ft. to 40 ft.)	14
Thrown from autos, 3; wagon, 1	4
Run over by autos, 2; other vehicles, 2 ..	4
Thrown down by autos, 2; wagon, 1	3
Crushed by falling of heavy objects	3
	28

Horses 3. Autos 7.

Mechanism: Force applied so as to flex whole spine.

patients fell from a height, alighting on feet or buttocks. Most of them fell a considerable distance, as much as 40 feet, but one patient received his injury when his feet slipped from under him on the icy sidewalk, and he came down hard upon the buttocks. He will be referred to later (Case 36). Three of these patients had fractures about the ankle, though in no case was the calcaneus fractured. Two men were working on a scaffold when it gave way and they fell 35 feet to the ground. Both had crushing fractures in the thoracico-lumbar region, and fracture of one or both ankles (Cases 42 and 43). Of the others, 4 were thrown from fast-moving vehicles, 4 were run over (and presumably doubled forward) by heavy vehicles; 3 were thrown down by vehicles, and 3 were crushed by heavy objects that fell upon them. Of the 28, 7 were injured by motor cars, and 3 by horse-drawn vehicles.

Table VII

Fracturing Force in 6 "Lower Lumbar" Cases

More or less direct violence	3
(a) Coal fell on him from a height.	
(b) Telephone pole rolled on him.	
(c) Struck by freight train.	
Fell six feet with collapsing verandah steps	1
Stepped into a hole eighteen inches deep (fracture by hyperextension)	1
Unknown	1
	6

The six patients classified as lower lumbar cases are a heterogeneous group. (Table VII). In one of them, the nature of the accident is not recorded. Of the 2 who had the fourth lumbar vertebra crushed, one was buried by a quantity of coal that fell upon him from a height; while the other, a boy of nine, fell down the sloping end of a pile of telephone poles and was crushed by one of the poles that rolled down with him. The violence was probably applied directly to the injured region of the spine in these two patients, and in the next one. He had been struck by a freight train and rendered unconscious. He had a forward dislocation of the spine on the sacrum—a true traumatic spondylo-listhesis. A stout woman descending the verandah steps broke them down and fell four or five feet. She had a slight fracture dislocation between the fourth and fifth lumbar vertebræ. No explanation of the mechanism is offered in her case. But the sixth patient is of interest from the standpoint of mechanism (Case 46). He was a heavy man 46 years of age. He unexpectedly stepped into a hole eighteen inches deep. He fell sideways, and, as he threw himself backward, he gave his whole body a jar, and experienced sharp pain in the lumbar region. He was able to work for two days, and then had to stop because of severe lumbar pain felt especially on rising from or resuming the recumbent position. This pain became very severe, so that he was confined to his bed continuously. He was referred to me three weeks after his accident by Dr. Andrew Sykes. The x-ray showed a chip off the antero-superior aspect of the fourth lumbar vertebra. This is the only case in our series of fracture by hyperextension and is exactly similar to a case described by Wilmoth.[1]

Signs and Symptoms of Thoracico-Lumbar Fracture

In this series the signs and symptoms have varied so greatly that they do not lend themselves to analysis except in the thoracico-lumbar group. But as this group contains the majority of the cases, in this as in other series, a study of the clinical aspects of injury in this region should be of value. It will be recalled that ordinarily in the adult the spinal cord does not extend below the level of the upper border of the second lumbar vertebra. Below this, the

neural canal contains the cauda equina, while above the lumbar enlargement extends to the level of the tenth thoracic. The situation of the lumbar enlargement, therefore, corresponds pretty closely with the region of the spine where fracture most commonly occurs. Most of the lumbar enlargement, however, is above the first lumbar, the vertebra most often injured. Opposite it the cord tapers rapidly to form the conus medullaris. A crushing fracture of the body of one or more of these vertebræ, or a fracture dislocation in this region, naturally does not always produce the same clinical phenomena.

Just one-half of our 28 cases showed no neurological symptom or sign except pain. In some the sensory symptoms predominated. In others the signs were mostly those of an upper motor neurone lesion; while others presented mainly bladder symptoms. Fig. 2, shows the findings in a patient whose disability was due largely to sensory disturbances, producing unsteadiness of gait and a positive Romberg sign.

TABLE VIII

RETENTION OF URINE

In 12	Cervical cases
	5 had retention—one recovered.
In 4	"Thoracic" cases
	1 had retention—he recovered.
In 28	"Thoracico-Lumbar" cases
	11 had retention—9 recovered.
	2 died of urinary infection.
In 6	"Lower Lumbar" cases
	none had retention.
In 50	patients with fracture or dislocation of the spine 17 had retention of urine and 11 recovered—2 died of urinary infection.

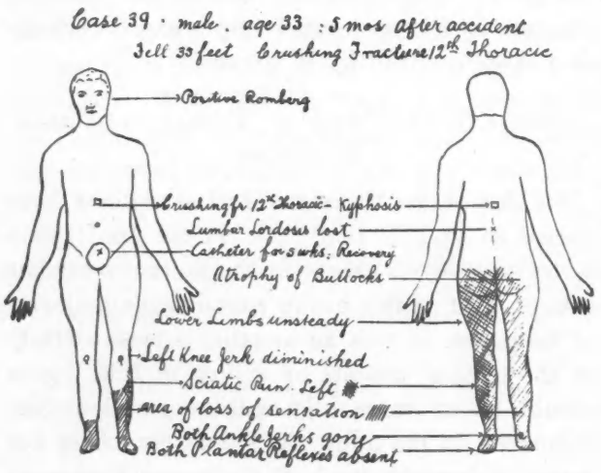

Case 39 · male . age 33 : 5 mos after accident
Fell 35 feet Crushing Fracture 12th Thoracic
Positive Romberg
Crushing fr 12th Thoracic - Kyphosis
Lumbar Lordosis lost
Catheter for 5 wks. Recovery
Atrophy of Buttocks
Lower Limbs unsteady
Left Knee Jerk diminished
Sciatic Pain Left
area of loss of sensation
Both Ankle Jerks gone
Both Plantar Reflexes absent

FIG. 2.—*Case 39.* Crushing fracture of the 12th. Thoracic. Sensory involvement chiefly.

(Case 39). Although the only paralysis made out was some weakness and atrophy of the buttock muscles, the man was completely incapacitated from doing labouring work. Eight of the 28 patients showed rather extensive sensory disturbances from the trochanter down. Only 3 of them had anæsthesia confined to the saddle area.

Paralysis of the muscles may be of the peripheral types as in the above case. Some of the anterior horn cells of the nucleus for some of his lower lumbar or upper sacral roots must have been destroyed. Paralysis of the upper motor neurone type, with marked spasticity of the lower limbs, sufficient to constitute a serious disability, is not an uncommon result, and was present in several of our patients. Patient 18, for instance, had a crushing fracture of the body of the first lumbar. Bladder and sensory symptoms were marked at first, but when last examined, one year after the accident, his disability was entirely due to spastic paralysis, and he could walk only with two canes.

Eleven of the 28 patients in the thoracico-lumbar group had retention of urine at first. In two of these, this persisted until death, which resulted from infection of the urinary tract. It is a pleasure to record that the other nine recovered voluntary control. In several of them, the bladder paralysis lasted only 10 days or so, but in others a much longer period went by before any improvement was noticed. Our experience has taught us to assume a very hopeful attitude in this connection. A patient seen last summer illustrates this point (Case 27). She had been treated by Dr. Galloway in 1919, when she had sustained a crushing fracture of the first and second lumbar vertebræ. From the beginning she had complete urinary retention with paraplegia and almost total loss of sensation in both lower limbs. After months of persistent treatment she went home, able to walk with two caliper splints and crutches, a tripod walk. She told me last summer, that she had had an automatic bladder for four years after the accident. Then improvement set in, and now for four years she has had complete voluntary control.

One of the four "thoracic" patients had retention of urine at first. He recovered in four days. In the twelve cervical cases the results were not so good. Five of them had retention,

and only one regained control. There was no case of urinary retention in the six patients whose lesion was below the second lumbar.

Treatment of Paralysis of the Bladder

The routine treatment that we have adopted in these patients with urinary retention is as follows. Catheterization is ordered every eight hours, so that overdistension is avoided. After the urine has been drawn off, the bladder is irrigated with one pint of sterile boric acid solution, and then an ounce of 15 per cent argyrol is instilled, and the catheter is withdrawn. In some of the infected cases, we have thought that the substitution of mercurochrome for argyrol has been advantageous. During the weeks that follow, the patient is always encouraged to urinate each time before the catheter is used. This treatment is kept up until satisfactory evacuation of the bladder has become established, either voluntary or automatic. We feel confident that no case of serious urinary infection has resulted from this treatment and that some cases that were infected elsewhere have cleared up.

The two patients who died of urinary infection are of interest in this connection. Case 40 had a crushing fracture of the first lumbar and complete cord lesion. Following the teaching of the late John B. Murphy,[2] he was not catheterized, and an automatic bladder became established. Ten weeks after the accident he developed severe colicky pains in the right loin with a high temperature and urine loaded with pus. He had developed kidney infection in spite of the fact that there had been no intravesical instrumentation. He died eighteen months after his accident. The other patient (Case 26) had an infected bladder on admission, and probably had not been regularly catheterized up to that time.

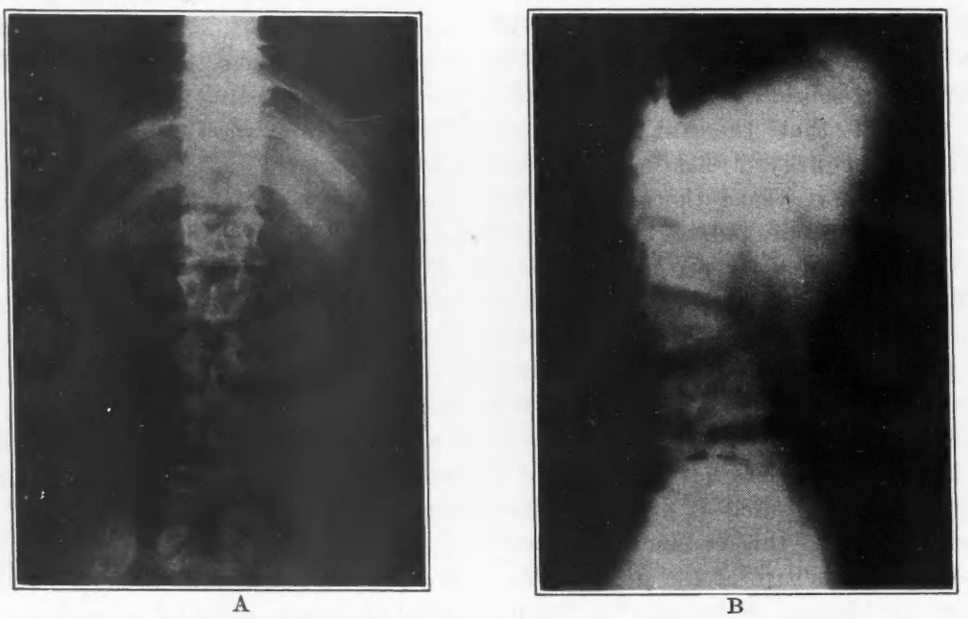
Diagnosis

The diagnosis may be easy or difficult. The history is important, but may lead us astray. It must be remembered that a very slight trauma may cause a fracture or dislocation of the spine, as illustrated in several of our cases. A history very suggestive of fracture may be obtained from many patients who turn out to have had osteoarthritis aggravated by injury. Similar mistakes may occur in connection with Pott's disease. A history of injury is very common in patients with bone and joint tuberculosis in any situation, and the spine is no exception. On the other hand what appears at first to be Pott's disease may turn out to be fracture. This is illustrated by Case 36. This man presented himself complaining of backache and showing a kyphosis in the thoracico-lumbar region. He stated that some months before when walking on the icy sidewalk, his feet had slipped from under him, and he had come down hard on his buttocks and suffered sudden severe pain. Since then he had had backache increased by activity and relieved by rest. The radiograph showed a crushing fracture of the first lumbar. Curiously enough, his wife came to see me a few days later complaining of backache, and she had lumbar Pott's disease.

The physical examination may or may not make the diagnosis. It should be as complete as possible for two reasons: First, because many of the physical signs may be missed, only to show up on later examinations, thus discrediting the examiner or leading him to believe that a progressive lesion is present. Perhaps many of the cases of "Kümmel's disease" can be accounted for in this way. The other reason, and a very important one for a thorough physical examination, is that only after such has been carried out can the surgeon give satisfactory directions for the x-ray examination. The recognition of fracture of the spine has been delayed only too frequently because this has not been done.

The final diagnosis must often depend upon the x-ray examination. This must be done so as to give the maximum amount of information, or frequent mistakes will occur. Some ingenious physicians, I believe, still exclude a fracture of the spine on the report of a single negative antero-posterior film. This is a mistake that should not be made. Fig. 3 illustrates this point, and similar examples could be taken from our series. The antero-posterior view might easily be passed as normal, while the lateral view shows very marked deformity of the third lumbar vertebra. Because the lumbar spine is convex forward, it is impossible in the normal spine to obtain a clear outline of the bodies of more than two or three lumbar vertebræ in the antero-posterior view. The reason that four bodies are shown so clearly

in Fig. 3 is that this spine is somewhat convex backward, and the antero-posterior view is not really normal. For some years the writer has insisted upon two views; a lateral view and a stereoscopic antero-posterior view, made with the vertical shift. One advantage of the vertical shift is that each of the films usually shows one or two vertebræ bodies clearly above or below those shown clearly by the other. If this is done, after a thorough physical examination has enabled the surgeon to determine what part of the spine should be examined by the x-ray, fewer mistakes will occur, and cases of "Kümmel's disease" will be very seldom encountered.



A B

FIG. 3.—*Case 47.* Crushing fracture of third lumbar. The antero-posterior view (A) might be read as normal, were it not that the bodies of all the lumbar vertebræ show clearly, indicating that the spine is concave forward, as shown in the lateral view (B).

TREATMENT OF THORACICO-LUMBAR CASES

We have followed a definite line of treatment in these cases. The method outlined below was first used by Dr. H. P. H. Galloway in August, 1923, and so far as I know has not been described except in a previous article by the writer.[3] The principles underlying it are the principles we follow in the treatment of fractures generally, *viz.*, manipulation, so as to restore as far as possible the alignment of the bones, followed by fixation with an apparatus that will permit of immobilization, and efficient nursing care during the long period that must elapse before the bones become consolidated. The patient is anæsthetized and turned upon his face. Strong traction is then made by assistants upon the head and shoulders, and upon the lower limbs. Sandbags are placed under the thorax and under the upper part of the thigh, and, while the traction is maintained, the operator presses forward upon the kyphosis, so as to reduce it and restore the lumbar lordosis. When this has been accomplished a plaster shell is moulded to fit the posterior half of the trunk and lower limbs as far as the middle of the legs. The patient is then turned over and lies on this posterior shell, while the anterior shell is made. The anterior shell is then lifted off, and the patient is returned to the ward lying on the posterior shell. Orders are given that he is to be turned at least once a day, and allowed to lie prone on the anterior shell as long as he is comfortable and it is convenient for the nursing staff to leave him so lying.

We have used this method in 12 recent cases. Two of them referred to above eventually died from urinary infection. The progress of the other 10 has been regarded as quite satisfactory. In no case has there been any evidence of injury to the intraspinal structures during the manipulation. Indeed all of them have gone on uninterruptedly toward a partial or complete recovery following the manipulation. The ease with which these patients can be turned without

bending or twisting the injured spine, as well as the evident painlessness of this procedure, is very gratifying to all concerned. Bedsores can occur if in making the shells care has not been taken to mould and pad them so as to prevent pressure over bony points. But even if this has not been done as efficiently as it might have been, inasmuch as the back is inspected daily, early warning is given, and precautions can be taken to prevent bedsores. In the one patient who had sustained a complete transverse lesion of the cord at the level of the first lumbar bedsores occurred in spite of everything we could do to prevent them. Even in his case, however, I believe that the nursing problems were simplified by this method of treatment.

After a period of eight to ten weeks on the shells a plaster jacket is applied, to be worn for a similar period, during which time the patient gradually becomes ambulant. Some of our patients have been fitted with a Carson "cow horn" brace, to be worn for a few months after the jacket has been discarded. Whether or not this is considered necessary depends upon the symptoms and physical signs and upon the x-ray evidence of consolidation of the injured region of the spine. Usually it is not thought necessary.

By this method we have been able to restore a satisfactory lumbar lordosis, and to hold it during the course of treatment. We cannot check the result by x-ray examination for many weeks, because it is impossible to take a lateral view without removing the patient from the shell. The skiagram taken at the completion of the treatment usually shows a well marked improvement over the original condition, with unfolding of the body that had been crushed. Two patients did not show this improvement and in one the deformity had actually increased. Probably too little force had been applied at the time of the original manipulation, or the posterior shell was not properly moulded so as to fit into a normal lumbar lordosis. The failure was not due to the method but to faulty application of it. It is our impression that increase in the deformity is the rule in patients who have not had this or other efficient treatment.

We are satisfied with the functional results attained in this way. Though we find it impossible to prove, we believe that bladder symptoms and paralysis, if present, have cleared up better than they would have without this treatment, and that backache and root pains are much less frequent sequelæ. Our anatomical results have been good, though not as good as those recently reported by Rogers[4] of Boston with his hyperextension frame. I believe, however, that the method is sound, and that we will obtain even better anatomical results in the future.

Fusion

Should a fusion operation be done on these spines, and if so when? It would seem reasonable to say that if the fractured region will not become consolidated without operation the time to do a fusion is immediately after manipulation, or as soon as the patient has become comfortable in his shells. This plan was followed in four of our patients. One of them died of post-operative infection. The other three made an excellent recovery. Whether they did better than they would have done without the fusion operation the writer is unable to say. The results for the patients treated in the shell without fusion seem to have been just as good. We have not known of any of them developing Kümmel's syndrome. The one fatal case reminds us that fusion operations carry with them an element of risk. Finally, skiagrams taken years after some of these fractures show excellent fusion brought about by nature. (Fig.

Fig. 4.—*Case 45.* Three years after a crushing fracture of the fourth lumbar. Illustrates how fusion can be brought about by nature.

4). The writer concludes that it is only exceptionally that fusion is indicated for recent cases.

Fusion for patients who present themselves months or years after the accident is a different matter. If they suffer pain brought on by activity and relieved by rest fusion is indicated. In our 28 "thoracico-lumbar" cases there were only four such patients, so no conclusion can be drawn from them. But excellent results in large series of cases have been reported by Hibbs[5] and others. While on the question of fusion, two cases should be considered.

The first is Case 5, aged 20. He had been thrown from a plough when his horses ran away, and had a severe lesion, the fifth cervical vertebra being displaced forward, so that its inferior border rested upon the anterior surface of the sixth (Fig. 5). That was in July. He was back doing light work in a month, and worked through the harvest and threshing, but after the freeze-up he noticed increasing stiffness in the neck, and increasing pain in the region of the right shoulder. Examination showed marked stiffness in the neck and weakness of the right arm confined to the muscles supplied by the 6th cervical nerve trunk. A bone graft was put in so as to fuse the cervical spine. When last examined two years after the accident he had no pain at all, his right arm was just as strong as his left, and he was doing full duty on the farm at home. We conclude that the fusion operation was of great benefit to him.

FIG. 5.—*Case 5.* Dislocation of the fifth cervical vertebra, so that its inferior surface is in contact with the anterior surface of the sixth. There were no cord symptoms. Partial paralysis of motor and sensory function of 6th cervical nerve trunk. Recovery after fusion.

The other patient is Case 50. Early one morning he was struck by a freight train, and sustained a terrible injury. The x-ray showed a complete dislocation of the spine forward upon the sacrum. He was treated as outlined in discussing the treatment of "thoracico-lumbar" cases. X-ray taken three months after the accident showed that the reduction had been complete. A plaster jacket spica was applied, and he was encouraged to be out of bed a little more each day. When this was removed four months later, the x-ray showed that the deformity had recurred to a certain extent. As the films of this very ill patient were not clear enough for reproduction, a diagram made from the tracings of them is presented (Fig. 6). We may conclude that a fusion operation should have been done for him as soon as his recovery from the initial shock permitted.

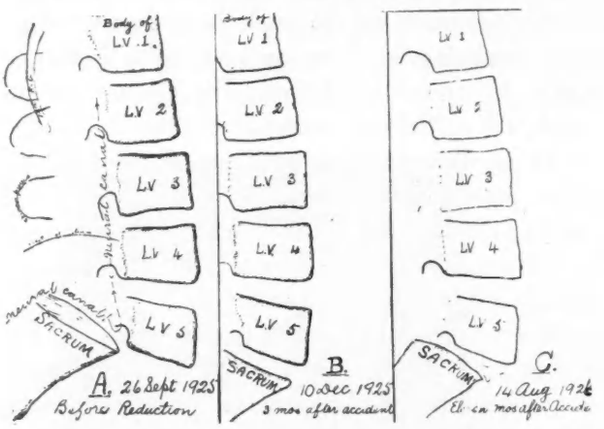


FIG. 6.—*Case 50.* Traumatic spondylolisthesis. Note the perfect reposition obtained and maintained during three months' recumbency in the shells.

LAMINECTOMY

A problem that presses for solution when one is called upon to advise a patient with a fractured spine is whether or not a laminectomy should be done. The writer feels that this operation is very seldom called for. Laminectomy has been recommended for the relief of bony pressure. I believe that direct bony pressure upon the intraspinal structures very seldom occurs, except in those cases where

FIG. 7.—*Case 35.* A severe lesion, causing paraplegia and retention of urine from which patient recovered without laminectomy.

these structures have been destroyed. It would seem reasonable to suppose that the greatest displacement of bones occurs at the moment of the accident, and that as soon as the fracturing and dislocating force ceases to act there is a recoil, during which the bones settle back toward the normal position. Certainly the degree of displacement as shown in the skiagram is not always an indication of the extent of injury to the cord. To be sure, films are seen occasionally which show that the spine has remained completely dislocated; obviously laminectomy would be futile under such circumstances. But the only complete cord lesion in our 50 cases gave us a very innocent looking skiagram (Case 40). Fig. 7 shows what is apparently a much more severe bony lesion (Case 35). When first examined, the patient appeared to be very badly hit, but has now, three years after his accident, been at work every day for two years as a timekeeper, and has recovered voluntary control of his bladder. At operation, done a few days after the accident, some improvement in the alignment of the spine was obtained and a bone graft was put in.

The extent to which displacement can show in the film without cord involvement is illustrated in Case 5 mentioned above, Fig. 7. The writer saw a very similar case in consultation during the same autumn, in which there was no paraplegia, but the subsequent history is unknown. In contrast with these two cases is Case 9 of this series. The skiagram showed only slight forward displacement of the fourth cervical vertebra on the fifth, but his physician stated that he had had complete paralysis and loss of sensation of all four limbs at first, and when I examined him two days after his accident he had almost complete paralysis of both legs and arms with retention of urine. His subsequent course has been very gratifying. Under conservative treatment, the recovery which had begun continued uninterruptedly, so that when seen three months after his accident there was no sign of paralysis left except weakness in the right deltoid, which was acting, though not against gravity. Ten months after his accident, he was back at work as a dentist, and reported that one day he had succeeded in extracting a full set of teeth, both upper and lower. Laminectomy was considered in his case, but fortunately we decided against it. Finally in this connection Case 8 should be mentioned. This man fell from the high seat of a wagon, alighting on his head on the frozen ground. Examination two days later showed the signs of a total cord lesion at the level of the sixth cervical vertebra, and he died a few days later without showing any improvement. The x-ray of his cervical spine did not reveal the bony lesion which undoubtedly existed.

A study of these and similar cases has convinced the writer that the x-ray appearance is not usually of value in deciding for or against laminectomy, and that bony pressure on the intraspinal structures is not often, if ever, a factor in keeping up the disability.

Laminectomy has been advised to counteract the effects of swelling or œdema of the cord or of hæmorrhage into it. The indications for laminectomy in such cases are said to be a progressive lesion. I have not seen such a patient, and doubt, if such a one presented himself, whether laminectomy would be of service. Most of the advocates of laminectomy urge that it should be done early, within 24 hours, for instance. It is as though they felt that they would have to hurry to get the operation done, before spontaneous improvement set in. In the case histories of successful laminectomies that I have read, it seemed difficult for me to realize that the patients had done better than did many of the patients that I have seen treated conservatively. Laminectomy is a serious operation. It carries with it a high mortality. It was done for two of our 50 patients, both in desperate straits, who welcomed any glimmer of hope that could be held out to them. Both had to be listed as operative deaths. Mixter,[6] of Boston, an advocate of laminectomy in fracture-dislocations of the spine, gives his mortality as six out of sixteen cases. A very serious operation this, and one that should not be undertaken unless very convincing arguments can be put forward to show that it can be of very great service to the patient under consideration.

Summary

1. Fractures and dislocations of the spine are common enough to be of interest to the general practitioner.

2. Fracture of the spine may be caused by

trauma so slight that it may not be suspected, but the mechanism in the various parts of the spine is well understood.

3. Lateral x-ray pictures of the region suspected are of first importance in diagnosis.

4. A method of treatment is outlined, which for simplicity and effectiveness is comparable with the accepted treatment for Colles' fracture of the wrist.

5. Spinal fusion is not often indicated in the early cases, but is of great value in the late neglected cases.

6. Inasmuch as pressure of bone upon the cord is rarely if ever a factor in keeping up the disability, laminectomy is very seldom indicated.

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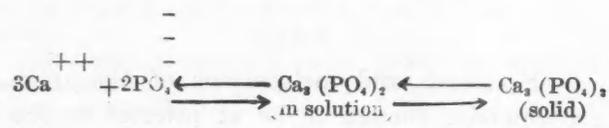
THE PHOSPHATASE OF FETAL BONE*

BY EARL J. KING AND G. EDWARD HALL

Toronto

IN 1923, Dr. R. Robison,[1] of the Lister Institute, London, began a series of experiments on the phosphatase enzyme of bone which have led to a clearer conception of the process of bone formation, and a better understanding of the mechanism of calcium phosphate deposition.

The enzyme, which he showed to be present in bone and ossifying cartilage, could be extracted, after breaking up the bone, by treatment with chloroform water. This extract, added to a solution of a primary ester of phosphoric acid, would liberate the phosphorus from its organic combination and, in the presence of inorganic calcium, deposit it as calcium phosphate. Robison suggested that the bone enzyme in the hypertrophic cells of the tissue where ossification takes place liberates free phosphate from the organic esters of phosphorus contained in the fluids bathing the bone or cartilage, thus giving a local increase in the amount of inorganic phosphorus in solution. According to the mass law, any increase in the concentration of phosphate-ion, would, in the presence of inorganic calcium, lead to a deposition of calcium phosphate.



It was demonstrated that when the bones of rachitic rats were immersed in a solution of calcium glycero-phosphate a dense deposit of calcium phosphate was formed in the matrix of the hypertrophic cartilage, where ossification normally occurs in the animal receiving a proper diet. Since it was only by the action of the bone enzyme that inorganic calcium phosphate could be formed from the glycerophosphate, both the seat of action of the enzyme and its ability to bring about calcification were thus shown.

That there is a natural substrate for this bone phosphatase in the plasma was shown by Martland and Robison,[2] and Kay and Robison,[3] They showed that the bone phosphatase would act on a trichloracetic acid extract of blood serum or plasma which was made slightly alkaline, to liberate free phosphate in a manner similar to its action on a solution of glycerophosphate. Only a fraction of the total acid soluble phosphorus compounds of the plasma is attacked by the bone phosphatase, while the phosphoric esterase of muscle is almost without action on this fraction. There are thus present in plasma phosphoric esters which form a specific substrate for the bone phosphatase. Deposition of the solid phase may be brought about in plasma saturated with calcium phosphate by increasing the concentration of phosphate-ion, where the bone enzyme hydrolyses the phosphoric esters contained in the plasma. While the enzyme appeared to be

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invariably present in bone or ossifying cartilage, unossified cartilage failed to show any phosphatase activity. Working with the bones and cartilages of the human fetus, Martland and Robison failed to find any of the enzyme present in cartilage prior to the appearance of ossification centres, but demonstrated its presence wherever ossification was taking place.

Through the kindness of Dr. W. L. Robinson, of the Department of Pathology of this University, we obtained two human fetuses of six and eight months, the bones of which we used for a study of the distribution of the phosphatase enzyme. The results obtained are similar to the findings of Martland and Robison, large amounts of phosphatase being found in the parts where active ossification was in progress, smaller amounts in the regions where the process was just beginning, while very little, if any, enzyme activity was apparent in the epiphyseal and other parts where ossification had not yet begun.

The bones were dissected from the body of the fetus and freed of adhering tissue as completely as possible. The long bones were cut into three sections—shaft, metaphysis and epiphysis, and the other bones roughly divided into what appeared ossifying and non-ossifying parts. For the extraction of the enzyme, each sample of bone was weighed, ground with sand, and transferred to a centrifuge tube, with twenty times its weight of water saturated with chloroform. After standing for 48 hours at room temperature with occasional shaking, the tubes were centrifuged and the phosphatase activity of each extract determined by the method of Kay.

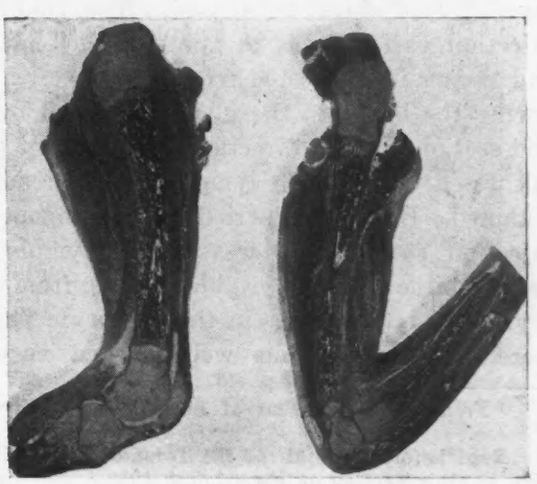
In each of four test tubes are placed 5 c.c. of Sorensen's glycine buffer of pH 8.9, 5 c.c. of 0.3 per cent sodium B-glycerophosphate of the same pH, and 0.5 c.c. of the bone extract. In two of the tubes the action of the enzyme is stopped immediately and the proteins precipitated by the addition of 2 c.c. of 25 per cent trichloracetic acid. The other two tubes are kept at 37.5° C. in a water thermostat for exactly two hours, when 2 c.c. of the trichloracetic acid are added. After filtering through ash-free filter papers, the inorganic phosphorus is determined in the filtrate by the Briggs colorimetric procedure. The increase in free phosphate during the two hour hydrolysis period is taken as a measure of the enzyme activity of the extract and hence the phosphatase content of the original bone. The amount of enzyme in the bone is expressed in arbitrary units of phosphatase, a unit being defined as the amount of enzyme in the original tissue which liberates 1 mg. of phosphorus from sodium B-glycerophosphate at the optimum pH of the enzyme (8.9) under the above conditions (Kay). The results for the bones of the two fetuses are given as units of phosphatase in the table. One arm and one leg of the six months' fetus were used for section. A photograph of the sections (x 2) is shown in the figure.

TABLE I

PHOSPHATASE CONTENT OF THE BONES OF HUMAN FETUSES

		Units of Phosphatase	
		6 month fetus	*8 month fetus*
Femur:	Shaft	6.32	4.08
	Metaphysis	4.48	7.88
	Epiphysis	0.36	0.26
Tibia:	Shaft	1.36	3.16
	Metaphysis	1.64	9.44
	Epiphysis	0.16	0.80
Humerus:	Shaft	1.44	2.04
	Metaphysis	3.88	8.28
	Epiphysis	0.08	0.12
Radius and Ulna:	Shaft	0.96	2.72
	Metaphysis	1.12	8.36
	Epiphysis	0.12	0.08
Foot:		0.68	0.64*
Hand:		1.64	0.88*
Parietals:		6.32	
Ilium and Pubes:	(ossified part)	8.04	
	(unossified part)	0.72	
Leg bones of young rabbits (Average of 10):		4.25	

* These figures are probably lower than the true values, owing to the considerable amounts of adhering tissue which it was found very difficult to remove.



By comparing the apparent rate at which calcification was progressing, as observed in the sections, with the figures contained in the table, it is seen that the enzyme was present in considerable amount in those portions where ossification appeared to be most advanced, or was proceeding most rapidly, while scarcely any enzyme activity was manifested by the epiphyseal cartilages where ossification had not yet extended. Likewise, in the case of the ilium and pubes, there was very little enzyme in the unossified marginal portion, while the rest of the bone, where ossification was extensive, had a high phosphatase content.

The results would appear to indicate, as observed by Martland and Robison,[2] that the phosphatase of bone is only present in those portions of a partly ossified bone where active ossification is taking place.

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2. MARTLAND AND ROBISON, *ibid.*, 1924, 18: 1354; 1926, 20: 847.
3. KAY AND ROBISON, *ibid.*, 1924, 18: 755.
4. ROBISON AND SOAMES, *ibid.*, 1924, 18: 740; 1930, 24: 1922.
5. KAY, *ibid.*, 1928, 22: 855.

LYMPHATIC SYSTEM OF THE THYROID GLAND*

BY STUART D. GORDON

Toronto

THE studies of Williamson and Pearse,[1] have suggested that the lymphatics of the thyroid gland are arranged in two distinct systems, one of which drains the capsular region in the cervical lymph glands, and the other, the secreting portion of the organ to the thymus. The following experiments were conducted for the purpose of testing the soundness of these views.

These experiments consisted of a series of attempts to inject the thyroid lymphatics in the dog with India ink. A fine needle was introduced through the capsule, but not into the parenchyma, and connected with a burette containing a 50 per cent solution of India ink in water held at a height of 32 inches or more. In most instances the injections were made in living dogs under amytal anæsthesia, but in several dead dogs were used. The time of injection varied from 20 minutes to 4 hours, and the amount injected from 2 to 6 c.c. Following the injection the glands were removed and sectioned in all directions. Proof that the ink was actually in the lymphatics was readily obtained. Dissection carried out subsequent to injection showed numerous small lymphatic vessels, hitherto undiscernible, passing from the thyroid to lymph-nodes in the vicinity. There were always numerous well marked vessels leading to a large lymph-node lying just internal to the angle of the jaw. Others coursed down the side of the trachea to a lymph node situated above the first rib. A few ran down over the surface of the trachea to end in small nodes of lymphatic tissue anterior to the trachea. In four cases the thyroid and lymphatic glands on the opposite side of the neck were injected by the one procedure. The injections were carried out on pups in three experiments and in none of these was any of the ink noted in the thymus.

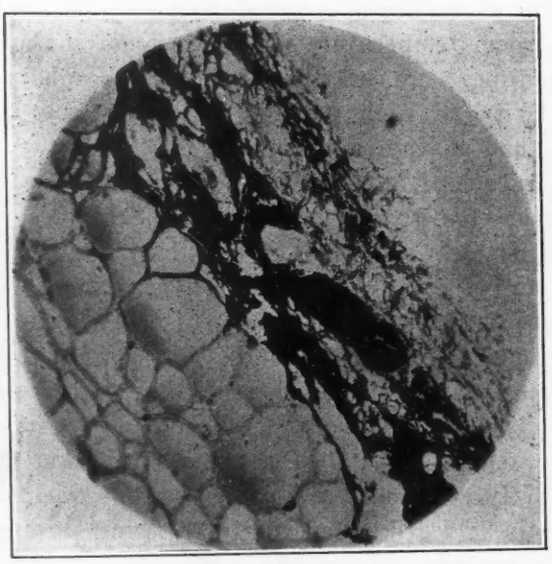

FIG. 1.—(x 94) Thyroid gland. Injected lymphatic trunks in the capsule are seen. The passing of the injected fluid into the intraglandular ducts is also shown.

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Read before the Staff of the Toronto General Hospital at their meeting on December 4, 1930.

A study of the sections obtained from these glands demonstrated in every case the ink passing in from the capsular to the intraglandular lymphatics. Furthermore several sections revealed tiny ducts leading into the acinar wall. These apparently ended at the internal limiting membrane of the acini, as was described by Matsunaga[2] in 1909. The intraglandular lymph-channels could be seen lying on either side of the blood vessels, whose branchings they followed. Thus it would seem that lymph which has come into the closest possible relation with the acini and the blood vessels of the thyroid gland drains to the cervical lymph glands. Starting at the internal limiting membrane of the acini it passes out along the interacinar lymphatics to reach the capsular ducts, and thence to the superior, inferior, and pre-tracheal lymph-nodes. Another point in the demonstration of

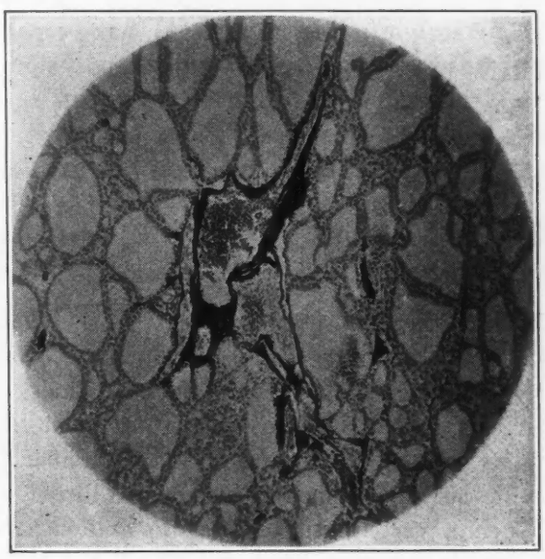

FIG. 2.—(x 94) The relation of the lymphatics of the thyroid to the blood vessels is clearly shown. As described in the text, they lie about the blood vessels, separating them from the acini.

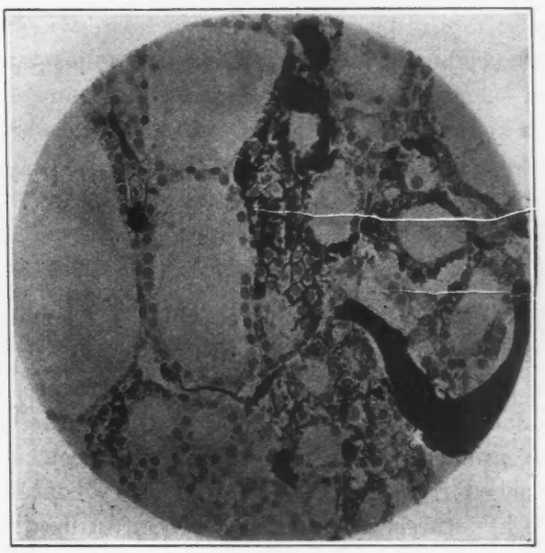

FIG. 3.—(x 375) This shows the fine intercellular lymphatics lying between the epithelial cells within the thyroid gland.

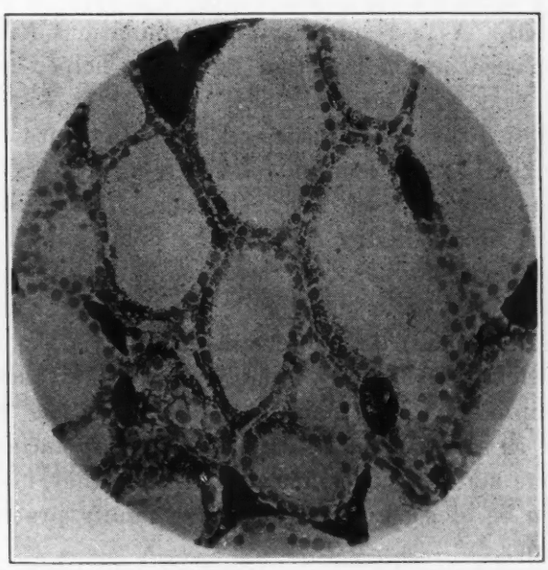

FIG. 4.—(x 375) Here are shown the fine lymphatics present in the acinar wall; they appear to stop at the internal limiting membrane.

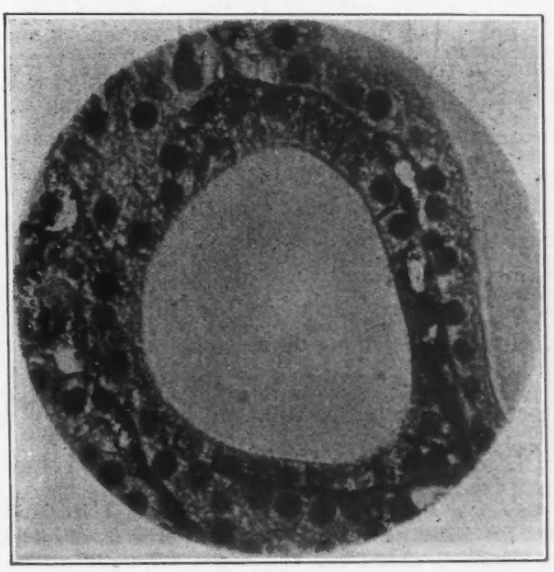

FIG. 5.—(x 575) This again shows the fine intercellular lymphatic ducts. The section was obtained after an injection into the thyroid of a dead dog. This rules out the possibility of phagocytosis being responsible for the position of the dye.

this fact is the result of the work of Hicks,[3] who has shown iodo-colloid in the lymphatic ducts leading from the thyroid gland.

In none of the sections studied was any evidence of a second closed system noted.

CONCLUSIONS

The following conclusions would seem to be justified by this study.

1. The capsular and intraglandular lymphatics of the thyroid communicate freely with one another.

2. The capsular system drains into the superior, inferior and pre-tracheal lymph-nodes.

3. There is no evidence of a second closed system draining into the thymus.

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SOME SIMPLE PSYCHIATRIC CONCEPTIONS

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I.

PSYCHIATRY is a subject which is receiving an ever increasing amount of attention from the profession, and an enormous literature is available, covering all aspects of this specialty. The problem of mental disease has been approached from every angle, and every conceivable hypothesis and theory has been utilized to explain the facts of mental abnormality. In fact, these hypotheses and theories are so numerous and so varied that we are forced to conclude that we are far from any satisfactory explanation of the true facts of abnormal psychology. I do not mean to insinuate that an enormous amount of truly scientific and valuable work has not been done; one is far from accepting as appropriate the title of a pamphlet published some years ago— "Psychiatry, the frail sister of Medicine." The busy practitioner, however, confronted with the demands of a general practice on the one hand and this enormous literature on the other, may well be forgiven if he wishes that the science were some decades older and had become simplified by the demonstration of facts and principles that we are to-day only groping for.†

During the last seven or eight years I have had the opportunity of observing some 2,500 cases, comprising all types of mental illness in their early stage, and have had in addition continuous contact with a fairly large number of chronic cases. The mental phenomena presented by such a varied group of acute and chronic patients are, as stated before, difficult to understand in the present state of our knowledge. Within the last three or four years, however, I have found that certain ideas and conceptions are becoming simplified and more definite in my mind. As a result, certain formulations have emerged, and I find that they have helped me to deal with mentally sick people. It is not implied that these ideas and conceptions are all original. Still less am I bold enough to argue that they are even relatively true. The veriest tyro in psychiatry can at once point out that the very simplicity of these conceptions makes them not only inadequate but also in some degree inaccurate in certain aspects. To such criticism I can only humbly repeat that these simplified conceptions have been of use to me as a doctor, and in the present very incomplete state of our knowledge, I hope they may also be of some use to the busy family practitioner.

* From a clinic at the Verdun Protestant Hospital under the direction of Dr. C. A. Porteous, medical superintendent, whose help and advice the writer gratefully acknowledges.

† For a concise and fair statement of what is known in psychiatry to-day, I cannot refer the reader to a better book than "Recent Advances in Psychiatry", by Henry Devine, published by the Macmillan Company. If the reader wishes a somewhat larger work treating the subject from the clinical aspect he cannot find a more standard text than Bleuler's "Psychiatry". The only translation that I know of is by Dr. A. A. Brill, of New York, published by the Macmillan Company.

I wish to exclude from the scope of this paper congenital feeble-mindedness and all psychoses which have been definitely proved to have a physical basis, *e.g.*, general paresis of the insane, senile decay, brain tumour, the end-results of drug and alcoholic addiction, toxic conditions, etc. I have confined myself to:— (1) the group commonly classed as dementia præcox (schizophrenia); (2) the class showing acute depression or acute mania; (3) the large mixed division showing both præcox and manic depressive features; and (4), the largest group of all, the so-called borderline cases, a large percentage of whom are never committed to an asylum, *viz.*, the hysterical and neurasthenic patients, those who turn to drugs and alcohol (I exclude those cases in which the secondary toxic effects of drugs are seen); in short, all those "nervous" people who are a constant source of worry to their doctors and families. This paper, briefly, deals with the so-called psychogenic psychoses, in other words, that great group of cases in which as yet we are unable to demonstrate any physiological or biochemical lesion as the cause of the mental trouble. I add the last clause because there is evidence to show that in many insane people there are differences, if not in the organic, at least in the biochemical make-up.* The extent and significance of these differences are as yet, however, far from being either completely ascertained or understood. They may or may not be the cause of the individual's trouble.

I do not mean to imply that a most painstaking physical examination should not be done in every case of mental trouble. The laboratory, the serologist, the trained internist should all be utilized. Any physical defect which is found should be treated precisely as it would be if it occurred in an individual of normal mentality. The thin, weak, asthenic person should be built up. Any signs of toxicity should be combated. Any focus of infection should be dealt with. Too often however these measures prove inadequate; the mental condition still persists, and in the present state of our knowledge we can only fall back on psychiatry for the actual management of the condition. In dealing with this large psychogenetic group, the members of which both within and without institutions show very varied forms of mental trouble, one of the first conceptions we should have clearly in mind is what we mean by the temperamental scale and the position of our particular patient on it.

Every individual can be placed somewhere on a scale which has as its extremes two clearly marked, definite and diametrically opposite, temperamental types. The great majority of sane people (but also, as will be seen later, many "nervous" and frankly insane individuals) are somewhere near the normal middle zone of this scale, and hence may partake of the characters of both. At the extreme ends however the types are sharply differentiated. At the one end we have what Jung described as the "introverted" type. Bleuler and Kraepelin speak of it as the "schizoid", but it is commonly spoken of as the "closed" type. At the other extreme we have what Jung spoke of as the "extroverted" type, what Bleuler speaks of as the "cyclothymic", or in plain words the "open" type.

We have all had experience with the first class, *viz.*, the persons whose thoughts and mental processes are far from being an open book, the persons whom we feel instinctively that we do not understand. They are very unsocial, they make no friends, they keep to themselves; contact with them gives one a feeling of strangeness. Often the parent will say, "Even as a child he was queer, different from my other children". Their conduct at times is strange, unusual. In the extreme types we find that at a very early age and without any apparent adequate cause these individuals begin to retreat more and more into themselves. More and more do they shun the world, taking less and less part in its activities. More and more do they begin to build up a wall around their personality through which we cannot penetrate. They become idle, lethargic, and untidy; often they have not sufficient contact with reality to follow the simplest rules of decency. If they are interfered with they may become irritated and violent. They are subject to strange compulsive forces arising from this closed-off inner life of which we can obtain no glimpse. In short, at a very early age, (in some cases even before puberty) before they have had time to

* The following papers are very interesting, even if somewhat hard to follow for those of us who have only a superficial knowledge of biochemistry. Mann, Morris, Rowe, Marsh, "The Determination of Urinary Acidity," *J. Men. Sc.*, 1928, **74**: 425; Golla, Mann, Marsh, "The Respiratory Regulation in Psychotic Subjects," *J. Men. Sc.*, 1928, **74**: 443.

encounter the stresses of life, and for no apparent reason, other than the fact that they were born so, we find these people full fledged victims of the mysterious malady dementia præcox (schizophrenia) and they become inmates of a mental hospital for the rest of their lives.

Before we leave this end of the scale however let us note one thing. It is the individuals who are *slightly* on the schizoid side who do the world's work. They are the steady, persevering, quiet, thoughtful type, the people who will pursue a given task till it is finished; they are not changeable and fitful.

At the other end of the scale we have the extremely open type. We have no trouble following their mental processes. Everything is on the surface, they are very changeable, often brilliant, but usually shallow. They may pursue a given task with marvellous energy for a while, only to have their interest soon flag. Their mood is variable. At times they are very elated, very energetic; the next morning may find them blue, depressed, retarded. In the extreme types we often find them for no adequate reason so wildly elated and energetic that we call them manic, or else so blue, depressed and retarded that we speak of them as melancholic. Both conditions may alternate and become so severe that institutional care is necessary (manic-depressive insanity). While the actual number of those on the cyclothymic side may be just as great as those in the schizoid division yet the number of individuals who show its extreme manifestation by breaking down at an early age into typical recurring mania or depression are relatively few compared to those who show the end results of the schizoid temperament. Enough cases of the former exist, however, to contrast the types.

As to why these differences of temperament exist, psychology has as yet no answer. Why are some condemned apparently from birth to become at an early age hopeless cases of dementia præcox, or else to suffer all their lives with more or less severe recurrent periods of mania or depression? Why among the people who are still within normal limits are some thoughtful, reserved, persevering, perhaps a little queer, while others are changeable, energetic and retarded by turns? Is it a matter of biochemistry, differences in the endocrine system, vicious parental or environmental influences, abnormalities in the emotions or instincts, or is there such a thing as a "psyche"? In regard to the question "Why are people as they are?" there are numberless theories but as yet no authoritative answer.

But these typical early cases of dementia præcox and lifelong cases of recurrent mania and depression are only a small proportion of the great flood of patients which is at present filling our mental institutions. They are a still smaller proportion of the many cases of nervous troubles which, kept at home, shadow many a family life and drive many a family doctor to distraction.

Furthermore, we have to recognize that people who are not by any means at the extreme end of the personality scale, indeed, many who are very close to the normal middle point, may at any age develop mental trouble, and this trouble can range all the way from hysteria, neurasthenia, addiction to drugs and alcohol, mild depressions, mild excitements, and conduct disorders of varying intensity, even up to severe depressions and manias. In very many instances people in adult life, whose previous history would indicate that they were not particularly closed, develop conditions so similar to the classical picture that in spite of the fact that they are not demented and are not young we label their illness late dementia præcox. For the purposes of this paper I should like to refer to this large and varied class as the middle zone group, the term middle zone, referring to their place on the temperamental scale, and it must not be forgotten that many of these patients are in the middle zone of life as well.

I do not wish to be misunderstood here. I am not implying that these patients who are within normal limits so far as the temperamental scale is concerned, and who as a consequence are able to meet the ordinary demands of life until they are 30, 40 or 50 years of age, are no different from the people who, no matter what vicissitudes they may meet during its course, remain sane to the end of life. The great majority of middle-zone patients do, often for years before they break down, show very visible evidences of certain dangerous characteristics and mental mechanisms. Their friends may not be able to understand or

classify these manifestations, yet they feel that these people are not entirely stable, and in many cases they are not greatly surprised when unmistakable signs of insanity occur. These manifestations may often be observed for years before gross mental trouble sets in. Furthermore, I feel quite strongly that it is often, in some degree at least, within our power to modify and counteract these dangerous tendencies. The proper, indeed the only, person to do this is the family doctor. He is usually the only person who while knowing the patient intimately also possesses the knowledge necessary to recognize and treat the dangerous symptoms; in addition he is often the only one in whom the patient has the necessary confidence, the only one in whom he or she will confide and the only one from whom warning and counsel will be accepted.

Before we take up these factors and mechanisms which render this middle-zone group susceptible to insanity, it will be clearer if we pause and take note of a second conception which I at least have found of value. This conception is to regard practically all psychogenetic mental disorders, from the mildest to the most severe, as forms of mental suicide, that is to say as escape-reactions. In other words, the individual by means of his psychosis escapes from a world in which the mental stress has grown too great for him. This conception may or may not be true; indeed in the present state of our knowledge any conviction that we may have about these matters will in all probability ultimately undergo considerable modification. But an observer seeing these cases in mass cannot but be struck by the fact that in nearly every case the psychosis has the effect, partially at least, of removing from the patient the necessity of facing his particular difficulties.

The family practitioner will, I think, agree with this assumption at least so far as the milder types are concerned. How often does he see an attack of "nerves" result in some member of a family escaping all his responsibilities. Many cases of drug addiction and alcoholism begin, I am convinced, because of the same unconscious, or possibly conscious, desire. We in institutional work are constantly seeing patients who have for years carried on their daily duties under a more or less severe load, only to escape finally, temporarily at least, from all their responsibilities through an attack of depression or mania, or we see them escape more permanently by shutting themselves off from reality into a world of phantasy, where all their long cherished dreams and desires are fulfilled. I shall take up this point again later on.

What are the other factors which will cause a personality not greatly different in temperament from thousands of others who go through life and bear its troubles, trials and responsibilities in a perfectly sane manner, to seek unconsciously an escape from them by means of a mental breakdown? The first factor, but in many cases the least important one, will occur to us at once, *viz.*, these people commit mental (often physical) suicide because of intolerable mental stress and conflict caused by some trouble occurring in their lives. Anyone who has surveyed a few hundreds or thousands of mental cases will, I think, agree with me when I say that the patients in this middle group do have histories which indicate on the whole a certain degree of mental anxiety, suffering and anguish. These psychic rocks, or mental insults, call them what you will, may not be discernible to the world; no one can know fully his neighbour's sorrow. The middle-aged spinster may seem contented, perfectly devoted and happy while caring for her old parents; the world may never know how much she longs to be a wife and mother, how acutely she still remembers the man she refused to marry in order to follow the path of duty, or with what dismay she looks forward to a lonely old age. No one may know how highly sexed she is, and with what stress she represses her sexual feelings. A man may give no indication of his remorse for a secret sin or his worry over its consequences. Every doctor knows how a parent feels when the results of an early indiscretion are visited on the child. Every doctor knows the numberless trials and tribulations which human flesh is heir to, and it will be carrying coals to Newcastle to tell him further what we mean when we speak of the psychic rock.

Now while we admit, or at least cannot exclude, the presence of a more or less severe mental insult in nearly all of these cases, a little thought will convince us that this cannot be the

only, or in many cases even an important, factor in making people seek to escape from the world. All mankind encounters trouble before life is over. "Man is born to trouble as the sparks fly upward" is as true to-day as it was when first spoken, and yet myriads of people have carried on in the past and are to-day carrying on in the face of difficulties just as great as, and often far greater than, those which apparently caused the break-down of the group we are considering. Any doctor need go no further than the families under his charge to know that one member will often carry the whole load, while the weak sister will hardly be able to maintain her balance, even with all the responsibility lifted from her shoulders. There must then be some other factor or factors which determine why some people break on a psychic rock that the majority will surmount in safety. As was said at the beginning, we are far from knowing why this is true. There is, however, one factor which does seem to be fairly constant in all these middle zone cases. I do not contend that it is the only one. I will not argue that it will ultimately be proved to be even the principal one, but in the present state of our knowledge the recognition of this factor is of value and helps us towards some understanding of the clinical pictures as we see them in every day practice.

In nearly all this group of patients, from the mild types outside the hospital to the gravest cases inside it, we find evidences in the history which lead us to suppose that for years before unmistakable mental symptoms developed the individual had suffered from what is known as magnification of the ego, or in other words an undue enlargement of the self. This term does not mean an over-valuation of one's own abilities; quite often these individuals are very humble; very often, in popular language, they may be said to have an inferiority-complex. The term is here used to describe the people to whom their feelings and emotions are very precious, the people who suffer intensely whenever there is any insult or injury to their emotional life. Every family physician will readily recognize the mother who "just *cannot bear* to see her child sick, who *cannot bear* to even think of losing it". I think every physician has heard—"Doctor, she *must* get better, you *must* make her well, I love her so." This type of mother does not say "What a pity she is sick and suffering; what a pity her young existence should end before life has opened up for her". Her whole thought is of her own threatened parental instincts. This is the type of mother who will become unreasonably jealous of her daughter's or son's fiancé, who cannot bear to think of losing her children by marriage. We see it again in the oversensitive individual, the person whose feelings are always being hurt, the wife who dissolves in tears because a hurried husband neglects to kiss her good-bye in the morning; we see it in the one who is always receiving a fancied slight, and continually sees a reference to himself when none is intended. The inability to take even moderate criticism without anger or tears is another symptom. Still another aspect of the same fundamental defect is seen in the people who are over-conscientious, forever striving to be perfect. The exclamation "To think that *I* would do that", "I cannot bear to think that *I* am that sort of person", often means that the individual is more wounded in his self-esteem than that he is worrying over the possible consequences of his acts to others. These people are often witty and sarcastic, but there is a lack of humour, and a deadly seriousness about everything which concerns their own feelings. If they are in trouble, that particular trouble and the feelings which it stirs blot out all the rest of the world. They often exaggerate the importance of any fault of which they are guilty. Walk through the wards of any mental hospital and you will be told not once but many times, "I am the worst woman in the world". The magnification goes even further than this; their faults are so great that the whole world is suffering therefrom; they read of a flood on the Mississippi or a famine in China, and they are convinced that these calamities happened because of their sin. Going through the wards of the hospital one can almost pick out these middle-zone patients as distinguished from the other groups by this magnified personality which they practically all exhibit. These people are completely absorbed in themselves and their own troubles. They have not lost all contact with the world; they often read, talk, take notice of what goes on around them, but everything is related to themselves, their self or ego has grown so large that no longer can they see the world in its proper perspective; everything is blocked out,

except what they can relate to themselves. On the wards three or four will surround the doctor, all talking at once, all occupied with themselves, all highly indignant that they cannot possess the doctor's ear exclusively. To pick a typical example.

Mr. Z., 50 years of age, a highly educated, conscientious member of one of our learned professions, became very depressed and attempted suicide after the death of his wife. He was brought to us very much distressed, absolutely unable to talk or think about anything but his own condition, unable at first to take his thoughts off himself sufficiently to perform even the simplest tasks. As time went on he became able to occupy himself with gardening. One day after he was, as we thought, well on the road to recovery, I heard him return the greeting of a sick nurse who was sitting in a wheeled chair on the grounds. He knew that this nurse was very sick, that she, an intelligent young woman just about to graduate, had been stricken down by a disease which would at best incapacitate her for years and might end in death, yet as we walked away and I made some comment on the dark future which was awaiting this girl, his reaction to it was to say " I did not sleep very well last night". This man has since recovered from his depression and now realizes that this enlargement of his self has been characteristic of him during all his adult life. He realizes that while he believed that he was unselfish and conscientious, yet this unselfishness and attention to duty arose not from a real and vital interest in his fellow men but from the fact that his anxious care for his own feelings was so great that he could not allow any shortcomings in what he had been trained from boyhood to regard as his duty. Had he allowed himself such derelictions in duty, his feelings of self esteem would have been wounded.

Friends and acquaintances instinctively recognize this absence of spontaneous and true interest in them and their affairs on the part of one so afflicted, and are often puzzled as to why, in view of the good qualities which the individual often has, they do not like him better than they do. In the case of Mr. Z., two or three people told me they could not understand why it was that, though they respected him as a very good man, they never had any instinctive and deep liking for him. To quote another example of this.

A few months ago a young woman came to me much concerned because she had been driven to recognize the fact that she did not like her mother. This realization distressed her very much, and she thought the fault must certainly be in herself since her mother was a good woman, one who had done everything for her daughter, denying herself in order that her daughter might be nicely dressed, have piano lessons, go to a good school, etc. A little investigation disclosed, however, the further facts that the mother was very sensitive, very easily hurt, very jealous of any friends which the daughter might make, that she was continually complaining that her children did not love her, etc.; in other words, the mother's self-sacrifice did not arise from a true selfless interest in the child; rather was it an offering to her own over-valued parental instincts.

If then an individual with such an enlargement of his ego encounters a psychic rock of any magnitude, it will be readily seen that such a disposition will greatly intensify its effects on his feelings, the patient is incapable of meeting the "slings and arrows" in a common sense manner, much less of laughing at them. If the situation is such that some decision must be made involving lacerations to his emotions he will be vacillating, unable to face the facts and to decide on and follow any fixed common sense course. In short the tendency to take some illogical road of escape will be very much greater than in persons not afflicted with this characteristic. This road of escape can quite easily be an hysterical illness which throws the whole burden on others. A neurasthenic attack does quite as well. The overgrown feelings can be relieved or blunted by drugs or alcohol; an attack of acute depression or mania will for a time serve the same purpose; or still graver and more permanent forms of mental abnormality may be utilized to avoid wounding the overgrown ego.

The diagram shown below summarizes, somewhat crudely it may be, all that I have attempted to say thus far in this paper:

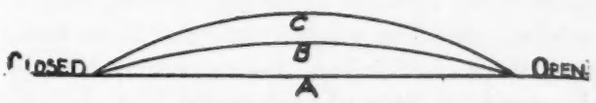

FIG. 1.—A. Temperamental scale. B. Curve of psychic rock or insult. C. Curve of magnification of the self.

I have said that all individuals can be placed on a scale ranging from the extremely closed to the extremely open type, the most of us fortunately being somewhere within the normal mean. Those individuals at the extreme ends of the scale are very apt at an early age to develop into typical cases of dementia præcox on the one hand, or early cases of manic-depressive insanity on the other. These differences in temperament seem inherent in the individuals, and, while numerous theories exist, psychology has no sure explanation to offer. It is a most interesting speculation for which we have some evidence to show that these differences are physio-chemical. Further, we are not yet able to demonstrate any other appreciable factor as entering into such psychosis. These cases, to

use a Western expression, "just naturally go crazy." I went on to point out however that such cases were by no means in the majority among mental illnesses. On the contrary we find among people who are well within the normal middle zone a great number of cases ranging from simple hysteria to very severe and hopeless insanity. In this middle zone group we can logically look for other factors than we are able to find in the extreme types.

Examination as a whole of this middle-zone group at once reveals that at least two additional factors can be demonstrated in the previous history of a large proportion of them. (1) We often get a history of a more or less severe psychic stress. (2) The severity of this stress has been much increased by a tendency on the part of the patient to overvalue his feelings. Hence the patient to escape the intolerable situation created by the interaction of these two factors is very liable to try to escape by means of physical suicide, drugs, alcohol, hysteria, neurasthenia, or what we consider to be an actual insanity. It will be seen that I have represented these two factors by lettered curves having their greatest height over the middle zone, but decreasing as they approach the extremes of the temperamental scale, where apparently these factors are not needed in the same degree.

(To be continued)

ARTIFICIAL PNEUMOTHORAX IN PULMONARY TUBERCULOSIS*

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IN the treatment of tuberculosis rest has generally been recognized as the important factor in promoting healing. As one writer states, "Rest is the keystone of successful treatment of tuberculosis of any organ and the more complely it can be achieved, the more successful is the result." This rest of course must be obtained under the proper hygienic conditions, in a bright, cheerful environment, and a fresh, invigorating atmosphere. An adequate, well balanced diet is essential.

The person in whom the tuberculous lesion in the chest is in its early stage and not very extensive will in many instances overcome the disease on bed-rest alone. In some, however, the resistance is poor, and the lesion continues to be progressive, or the lesion was well advanced when treatment commenced, and bed-rest alone is not sufficient. The problem of treatment then becomes more complicated. Some form of localized rest to the diseased lung becomes necessary in addition, or the patient is going to fail to make a recovery. The tuberculous lesion will continue to extend; caseation, softening and cavity formation may take place; discharges loaded with tubercle bacilli may pass into the bronchial tubes which at any time may be aspirated into other parts of the Some form of localized rest to the diseased lung becomes necessary in addition, or the or be swallowed and cause ulceration of the bowels. To prevent such a downward course of events, physicians to-day are using various methods of immobilizing the movements of the diseased lung, which seems best accomplished by some form of collapse. The measures most commonly used in obtaining this collapse are artificial pneumothorax, phrenicectomy or thoracoplasty. Of these, the most widely used is artificial pneumothorax.

Where formerly we placed the patient in bed and left him there for months and years, looking for possible improvement, and only inducing pneumothorax as a very last resort, to-day we are advising such treatment at a much earlier stage of the disease. As soon as it is felt that the patient is going to be unable to handle the tuberculous process on bed-rest alone, we consider the possibility of benefit from localized, added rest. In other words, we put the patient with pulmonary tuberculosis on complete bed-

* A paper read at a meeting of the Western Ontario Academy of Medicine, held at the Queen Alexandra Sanatorium, London, Ontario on March 27, 1931.

rest as soon as he comes in for treatment, and if he fails to show signs of improvement after a reasonable period, his condition is studied for possible pneumothorax treatment. We do this because we have learned that if the patient continues to run a fever, with rapid pulse, and coughs considerably, etc., after three to four months in bed, he will probably never be better than a chronic invalid at best. Again, an active tuberculous lesion, left alone, has a habit of gaining a foothold in the better lung at a fairly early stage of the disease, when means of control are lost, and adhesions are liable to form at any time which would prevent the lung from collapsing.

Artificial pneumothorax consists in introducing clean, filtered air into the pleural space surrounding the diseased lung, with the result of splinting and collapsing that lung. If the lung is not bound to the chest wall by adhesions, the gradually increasing amounts of air by repeated refills will increase the intrapleural pressure, and the lung will slowly become collapsed or immobilized, and functionless. By such a collapse there is an alteration in the circulation of the blood in the treated lung, with slowing of venous flow and lymph stasis, with less absorption of toxin. Again, cavities present become gradually closed and their walls approximated. The purulent discharges become decreased and stopped with the collapse and immobilization of the diseased lung. Resolution is promoted and fibrosis of the lesion stimulated, with the end-result of scar-formation in place of an active lesion.

With these changes, certain clinical effects become apparent. The patient's temperature rapidly subsides; the cough is less and expectoration is decreased; the sputum becomes negative, and any blood spitting is stopped. Furthermore, there is a favourable change in the general health of the patient; the appetite improves, his weight increases, and he becomes more optimistic.

Unfortunately, however, every case of pulmonary tuberculosis that does not benefit by bed-rest alone is not a suitable case for artificial pneumothorax. With the collapse of one lung, it is essential that the remaining lung be in sufficiently good condition to perform adequately the vital function of respiration without damage to it. This means that in deciding on artificial pneumothorax we must make sure that there is one lung in good condition. While the individual may do very well on artificial pneumothorax, in which the better lung has only a little scarring in the apex, or very light involvement which is not of a progressive nature, such collapse would be of no benefit if the better lung had an active lesion which was continually extending, or if there was so much damage as to embarrass the patient. In all probability such a lung would rapidly become worse under the extra functional activity. Furthermore, little would be accomplished in a patient who has an advanced laryngeal complication, an extensive ulceration of the bowel, a bilateral tuberculous kidney condition, or a decompensating heart. This means that in selecting cases likely to be helped by artificial pneumothorax, one has to thoroughly investigate the patient's condition, noting the symptoms, giving him a careful physical examination, and studying the x-ray films.

Some of the cases most likely to receive help from artificial pneumothorax are as follows:—(1) Probably those persons who benefit most from artificial pneumothorax and who offer the most favourable outlook for a good result are those in whom the lesion is relatively early, active, in one lung only, and who show no apparent improvement under ordinary bed-rest. In other words, after a reasonable period of rest in bed, the lesion continues to cause fever, rapid pulse and other signs and symptoms of continued activity. In these cases artificial pneumothorax has much to offer and gives every hope of bringing about an ultimate cure. The diseased focus is rested, the patient is detoxicated and the invasion of the infected parts by fibrous tissue is stimulated.

2. Another type of case is that in which there is extensive tuberculosis in one lung with widespread caseation and probably cavitation. Here the sputum is usually considerable, and constitutional symptoms are very evident. These cases seldom heal sufficiently on ordinary bed-rest and pneumothorax should be induced after a short period of observation. Pneumothorax frequently has much to offer them.

3. The patient with unilateral pneumonic phthisis. This type needs prompt action. In such people the toxæmia is profound, the tuberculous lesion may caseate and break down in a

few days. The patient's condition may rapidly fail and in a few weeks pneumothorax may be ineffective. Instant attention may save the day. Only if the symptoms are mild is it justifiable to wait and watch carefully.

4. In all cases of cavity of 2 cm. or over, where the lesion is unilateral, or where there is copious sputum loaded with bacilli. In some of these the patient's resistance is good and there may be some tendency to fibrosis, but from experience you feel that the cavity will not close. In this type pneumothorax may be given, not so much to control immediate symptoms but rather to avert spread of the disease and to make the patient less liable to infect others.

5. Then we have the case in which there is a moderately advanced lesion on the better side, but in which the better lung has shown, under rest, considerable healing and fibrosis, while the worse lung has slowly progressed. This does not make an ideal case, but I have seen patients of such types improve rapidly after the worse lung has been collapsed and who are now out doing considerable work and are self-supporting.

6. Then there is that important group of cases in which the introduction of artificial pneumothorax often gives spectacular results. I refer to patients who have uncontrollable hæmorrhage. If the side from which the hæmorrhage is coming can be determined, a few hundred c.c. of air introduced into the pleural cavity will, in most cases, rapidly stop the hæmoptysis.

Before the induction of artificial pneumothorax it is well to give your patient an idea of the nature of the operation, in a manner so as to reassure him. Also give him one last check-up. Take a glance at the films to definitely determine the most favourable site of initial puncture. The farther away from the diseased area or cavity, the less likelihood of puncturing the diseased portion and causing complications and of encountering adhesions. The most common site of entering the pleura is in the anterior axillary region, about the fifth interspace. The patient is prepared by giving him an injection of morphine, gr. 1/6 and atropine gr. 1/180, about a half hour before operation. He is placed on the operating table, lying on his good side with a hard pillow under the chest in such a position that the ribs are separated as widely as possible at the site of entrance. The skin around the site of puncture is sterilized by alcohol and iodine.*

A large variety of needles are used by different operators for the introduction of gas into the chest. Furthermore, a different type of needle is used for the initial operation from that used for refilling. The requirements of a needle for induction are that it must be capable of piercing the skin and superficial structures with ease, but it should be blunt at the moment of its passing the pleura, so as to avoid any risk of wounding the lung. These requirements are well satisfied by what is called the Kuss artificial pneumothorax needle. It consists of a cannula with an opening near the tip and a short side arm to connect with the tubing from the gas bottle. The cannula is fitted with a sharp-pointed trocar. The cannula with the trocar is pushed well into the intercostal muscles, when the trocar is replaced by a blunt stilette for its further passage into the pleural cavity. The stilette is grooved on one side so as to bring the side opening of the cannula into connection with the manometer. For refills, however, there is already a pocket of air in the pleural space and there is not now the same danger of wounding the lung, so that an ordinary 18 gauge sharp-pointed needle, about 1¼ inches long, is used which will pierce the chest wall with ease. The needles, lap cloth, and glass tubing containing cotton wool should be kept in packages which are sterilized previous to operation.

Much of the success of artificial pneumothorax treatments depends on giving the correct amount of gas at carefully spaced intervals. A slow, gradual compression is much preferable to giving large amounts of air and arriving quickly at a complete collapse. The gradual method rarely causes any appreciable distress, and no damage is done to the heart or mediastinum; also no sudden strain is thrown on the remaining lung. At the same time, the intervals between refills should not be made too long, as this gives the lung an opportunity to re-expand and increase its functional activity, or to become adherent to the

* There are a variety of types of pneumothorax apparatus, details of which are available in any good text-book on diseases of the chest.

chest wall. At induction of initial pneumothorax we usually give about 250 to 300 c.c. the first day, with about the same the next day. Then 300 or 400 c.c. are given once or twice every other day, with gradual lengthening of the interval by one day until the patient is on a 4 to 5 day interval, taking only the amount of air he can receive with comfort. At the end of about three weeks' time he will usually have a good percentage collapse, depending on the rate of absorption of the gas. At the end of six months the patient will be getting refills about every two weeks.

Furthermore, the intrapleural pressure should be kept reasonably low. When the needle enters the pleural cavity at the initial treatment, there is a characteristic swing of the manometer well to the negative with usually wide oscillations. As the air enters, the pressure slowly rises; with each subsequent refill the pressure may run slightly higher, and by the time an effective collapse is secured the final manometer pressure may be close to, or even above, atmospheric pressure. A point to remember is that often a good collapse is obtained with the pressure considerably below that of the atmosphere, and if you push the pressure much above the atmospheric pressure you may run into difficulties. The patient may become uncomfortable to distress; there may be shifting of the mediastinum or the heart to the opposite side; or ballooning of the pleura toward the opposite side. There is also a possibility of rupture of adhesions, or of causing an exacerbation on the other side. Only in rare occasions is it desirable to raise the intrapleural pressure much above zero, as when you may have considerable adhesions, and then do it only very cautiously.

Every patient receiving artificial pneumothorax should be fluoroscoped before and after, to determine the amount and location of collapse, the position of the heart and mediastinum, and to note presence of any fluid in the pneumothorax pocket. Again, a careful observation of the symptoms and course is essential, with periodic physical examinations and x-ray. The sputum should be examined for tubercle bacilli. Only by so doing can you determine improvement or retrogression and have a definite idea of the condition of the opposite lung. During the first two months the patient should be kept absolutely in bed, and it is well to keep him in the sanatorium the first six months.

Pneumothorax treatments should be kept up for a minimal period of two years in early cases, and, where there is cavity, close to five years, depending upon the length of time it took to collapse the cavity. The results depend largely on the success of getting a complete collapse, the ability of the other side to perform the extra functional activity demanded of it, and the avoidance of complications.

INDISPENSABLE USES OF NARCOTICS.—Morris Fishbein believes that the problem of narcotic addiction merits the attention of physicians for many reasons. The control by statute of the prescribing of alcohol, and the definite limitations of the amount prescribed, indicates that the medical profession must do everything possible to minimize the prescribing of narcotics in order to make unnecessary further restrictive measures. Physicians should give more serious consideration to the materia medica, pharmacology and therapeutics of narcotics. Physicians may, by the exercise of more thought in practising, do much to avoid censure in relation to narcotic addiction. They may substitute, whenever possible, nonhabit-forming drugs in the place of morphine or other opium alkaloids. When narcotics are indispensable, however, as shown in this series of articles, no more should be administered than is necessary to achieve the desired end. Patients requiring daily administration should be seen often by the doctor and the amount of drugs ordered or supplied should not exceed that required by the patient until seen again. Independence of administration on the part of nurses should be strictly limited to prescription and any change in treatment should be in writing. The patients should never be informed of the nature of the drug used, nor of the dose of drug administered. The patient should never be permitted to administer the drug hypodermically to himself. Use of the drug should be discontinued immediately when no longer required, and if craving has resulted, close supervision and appropriate treatment should be maintained until the patient has been rendered independent of the drug.—*J. Am. M. Ass.*, 1931, **96:** 856.

ISOLATION OF BRUCELLA ABORTUS FROM HUMAN FETUS.—Charles M. Carpenter and Ruth Boak report the first instance in which *Brucella abortus* was isolated from a human fetus. They were unable to determine whether the placenta as well as the fetus was infected or to study it histologically; but, basing their opinion on the mode of infection in other species of animals, such must have been the case. They believe that in this case the abortion was the result of an infection with *B. abortus* and that physicians investigating the pathology of the genito-urinary system should consider more frequently *B. abortus* as a possible etiological agent of disease in these tissues.—*J. Am. M. Ass.*, 1931, **95**.

HÆMORRHAGE AFTER THE MENOPAUSE*

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HÆMORRHAGE after the menopause is one of the commonest symptoms which makes a woman seek medical advice. Hæmorrhage before the menopause, be it profuse, scanty or irregular, is often interpreted as a perfectly physiological occurrence and so is often neglected with disastrous results. But the great percentage of women view with anxiety hæmorrhage which occurs after the climateric and consult their physicians early.

This symptom is produced by many different pathological conditions, but this should never cause us to treat the condition lightly, as malignant disease of the uterus is one of the most frequent, and by far the most important, cause of this symptom. I have chosen this subject for the particular purpose of emphasizing this fact and what I wish to be remembered can be epitomized in one sentence. Any hæmorrhage after the menopause should always make us suspicious of malignant uterine disease, and we are never justified in treating this symptom without making a vaginal examination and when vaginal examination reveals no growth of the cervix, a diagnostic curettage of the uterus should always be done to exclude malignant disease of the body. We were taught this in our undergraduate days; we all know it, but there are odd cases which escape and these are those the consulting gynæcologist so frequently sees. The numbers of inoperable and hopelessly late cases of malignant disease of the uterus are tremendous and appalling, nor do they appear to be lessening. The latest statistics in the British Isles, show that one woman in every eight who reaches the age of 35 suffers from cancer, cancer of the breast and uterus forming more than 90 per cent.

If the hæmorrhage is close after the menopause there appears to be an ineradicable belief among women that it is normal; little attention is paid to it and such late cases are only too numerous. There should be some form of public propaganda that any drawn out menopause attended by profuse or irregular bleeding is serious and that in such circumstances women should seek medical advice. Again, too, we are often placed at a disadvantage, more especially the men in general practice. It is an easy matter to suggest and carry out a vaginal examination upon a complete stranger, especially when she has consulted a gynæcologist for that purpose, but quite another matter when the patient is a personal friend or acquaintance, as she often is, of the general practitioner; and so when consulted about this symptom quite naturally the practitioner is inclined to temporize, hoping that the cause may be a simple one and not the one he really fears. In this way much valuable time may be lost.

The treatment of carcinoma of the cervix by the Wertheim method of hysterectomy is gradually disappearing and radium is taking its place, but the treatment of carcinoma of the fundus uteri is still surgical and will continue to be so. Operative treatment of malignant disease of the body of the uterus gives much better results than the same disease in the cervix. The disease in the body is self-limiting, and the patients as a rule are older, but in this situation, as in all other parts of the body, the earlier the recognition of this disease the better is the chance of cure by total extirpation.

CARCINOMA OF THE CERVIX

This is a very common disease, both after and before the menopause. It may occur as early as from 21 to 23 years of age. It is a disease which is practically always found in the parous cervix and usually in those cervices which have lacerations. On examination, a friable area is found on the cervix which bleeds freely, and usually the diagnosis is easy. Patients complaining of bleeding after coitus should be carefully

* Read before the Section of Obstetrics and Gynæcology, Academy of Medicine, Toronto, March 5, 1931.

examined for cervical carcinoma. The diagnosis, if at all in doubt, is easily established by the removal of a piece of the diseased tissue and submitting it to microscopic examination. The cases giving difficulty in diagnosis are those in which the growth commences in the cervical canal. Such cases often have a barrel-shaped cervix and a probe or sound passed causes free bleeding, with necrotic tissue coming away at times. All such cases should be examined under anæsthesia, when the diagnosis can be fully established.

Treatment. — 1. *Wertheim's hysterectomy.* This is a very radical operation with a high initial mortality.

2. *Radium.*—This is the method of choice and the one commonly adopted in early and certainly in late cases. There are many forms of technique. I shall mention three.

(a) *Regaud technique* in Paris. In this technique a maximum highly filtered dose of radium is given in one sitting. Before inserting the radium, however, it is advisable to have the vagina and cervix as clean as possible, spending a few days obtaining this result by lysol douching and packing the vagina with sterile gauze which has been soaked in acriflavine. When radium is inserted in the dirty malignant cervix, which is absolutely teeming with bacteria, there is always a great chance of pelvic cellulitis ensuing, which opens up lymphatics and tends to the spread of malignant cells by this channel. The preliminary cleansing by douching and packing helps to do away with this. It is never wise to use iodine or iodoform gauze. Iodine, being a metal breaks up the gamma rays with a resulting burn. The patient is placed in the lithotomy position, the cervix dilated to a No. 9 Hegar. It is most important to do this, even if it is a little difficult in late cases to find the cervical canal. The radium in a "T" shaped tube and fully screened with ½ mm. of gold or ¼ mm. of platinum and a thick coating of dental rubber is inserted in the canal. By this means the cervix is "cross-fired" by the radium, and the parametrium is reached by the rays spreading outwards from that part of the tube inserted at and above the internal os. By this method of thorough screening, radium can be left *in situ* for a much longer time without causing burns which might result in bladder or rectal fistula. The patient is given the maximum dose—8,640 mg. hours, and this does not have to be repeated.

(b) The *Stockholm technique* (Forsells) is much the same as Regaud's, except that the dose is divided into three sittings, a fortnight apart.

(c) *Ward and Farrar's technique* (Women's Hospital, New York). The results of treatment from 1919 to 1930 have just been published. I will read their conclusion: "Our experience of over 11 years with radium in carcinoma of the cervix leads us to believe that the best results can be obtained with the smaller doses of radium, 2,400 to 4,200 mg. hours, and re-radiation is given for local recurrences." Their absolute cure was 24.7 per cent. Bonney's percentage of cure by radical hysterectomy was 24.4. For the present, the problem can be summed up in two lines from "Locksley Hall."

> "Knowledge comes, but wisdom lingers, and I linger on the shore,
> And the individual withers and the world is more and more."

CARCINOMA OF THE BODY OF THE UTERUS

This disease is not nearly so common as carcinoma of the cervix. It occurs more often in nulliparæ, and either at the menopause or after. Very often the period of amenorrhœa is quite short. The symptom is bleeding and the physical signs are few. The uterus is sometimes enlarged, especially if a pyometra is present. A definite diagnosis can only be made with the curette, when the characteristic brain-like material is obtained. Pan-hysterectomy can be carried out at once under the one anæsthetic. If the diagnosis is in doubt, the curettings should be examined microscopically. Fortunately, a simple pan-hysterectomy gives as good a result as the more radical Wertheim hysterectomy, and the mortality is much less.

EROSION OF THE CERVIX

This consists of a slightly raised velvety patch extending from the external os over the vaginal portion of the cervix. This condition is at times mistaken for carcinoma of the cervix, for hæmorrhage is easily produced by the examining finger. Firm scraping generally settles the question, as the erosion is superficial, leaving a hard resilient surface, while carcinoma leaves a friable surface. In case of doubt, a piece of tissue should be removed and examined microscopically. Erosion, not being a primary path-

ological lesion, rarely causes bleeding and the few cases I have seen in which it did cause bleeding after the menopause were those following coitus. It is sometimes the result of some irritating discharge from the uterus and cervical canal and curettage and cauterization usually cures it.

FIBROIDS

After the menopause bleeding always means some form of degeneration or malignancy, therefore radiation for fibroids should not be used at this period of life. Carcinoma of the body is not uncommon in a fibroid uterus so that a preliminary diagnostic curettage should be done. It is important that a correct diagnosis be arrived at. If there is no malignancy a simple sub-total hysterectomy gives the desired result. If carcinoma is present as well a pan-hysterectomy must be performed.

MUCOUS POLYPI

These spring from the cervix, atrophic as the cervical mucosa is at this time of life. The polypi is usually found protruding from the external os. Twisting the polyp off and thorough curettage cures the condition. Mucous polypi usually indicate an unhealthy endometrium; therefore, curettage should be done and the cervical canal thoroughly scraped so as to remove any smaller ones which may be present.

SENILE ENDOMETRITIS

This is a very rare condition and usually found in multiparæ. The cervix being open, the atrophied endometrium is readily attacked by organisms from the vagina and becomes inflamed and bleeds. It is to be differentiated from carcinoma of the body. Curettage settles the diagnosis and cures the condition. The curettings are thin, not cheesy as in carcinoma of the body. The condition is a definite inflammation, and, microscopically, the curettings show atrophic endometrium with much chronic inflammation, plasma and round-celled infiltration. One should always exclude malignant disease by a thorough curettage.

These are the commonest causes of hæmorrhage after the menopause. Others, such as senile vaginitis, carcinoma of the vulva, vagina, clitoris, urethra are rare, and as a rule easily seen and diagnosed. There is the rare condition of carcinoma of the ovary causing hæmorrhage. This is due to the malignant ovarian cells causing ovarian stimulation, and hæmorrhage ensues, even if it be post-climacteric. This is exceedingly rare.

We should always remember the frequency of malignant disease of the uterus and consider all cases of hæmorrhage as due to malignancy until we have proved them otherwise.

THE SURGICAL TREATMENT OF ANGINA PECTORIS.—D. Danielopolu discusses the various operations that have been devised for the relief of angina pectoris. He refers to the operations involving extirpation of the stellate ganglion, and shows that they are apt to be followed by severe congestive heart failure. This he believes to be due to interruption of those sympathetic fibres which augment the force and rate of the heart, while increasing the blood pressure and dilating the coronary arteries. The author quotes animal experiments supporting this view, and remarks that such groups of patients in whom this operation has been performed without serious mortality have not been cardiac patients. The introduction of surgical treatment into current cardiological practice is thought to be desirable, but only if it were indispensable would extirpation of the stellate ganglion be justifiable, and only then in a patient in danger of death from frequent severe anginal attacks. The author claims that angina may be relieved by operation without excision of the stellate ganglion; he advises cervical sympathectomy combined with division of those branches of the vagus supplying the thorax and the rami communicantes uniting the inferior cervical and first thoracic ganglion to the three last cervical pairs; section of the first dorsal and the vertebral nerves is also performed. Among 28 patients operated upon in this way by various workers no fatality has occurred. Moreover, in the great majority there has been complete or almost complete relief from attacks for periods varying from one to five years. Sometimes operations on both right and left sides are necessary. In view of these results, operations involving the extirpation of the stellate ganglion are considered not only dangerous, but also unnecessary.—*Presse Méd.*, 1930, 1789.

THE VALUE AND LIMITATIONS OF SODIUM AMYTAL*

BY N. S. CLARK,

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SODIUM amytal is the sodium iso-amyl ethyl salt of barbituric acid. For several years it has been used in laboratory animals to produce anæsthesia but it was not until 1928 that McCallum used it to produce anæsthesia in man. It may be used in doses of 3 to 9 grains per mouth as a sedative or narcotic or as a 10 per cent solution in distilled water intravenously as a true anæsthetic. In this paper I will confine myself to the intravenous method of administration.

The dose varies from about 6 to 35 grains. The latter is the largest dose mentioned in the literature as having been given. The average is from 8 to 20 grains. It must be given very slowly, not faster than 1 c.c. of a 10 per cent solution per minute. The solution, when given, should be water clear and freshly prepared. If opalescent, it should be discarded, because of the liability to produce excessive fall in blood pressure and disturbance of the respiratory centre and consequent cyanosis. The blood pressure must be taken frequently during the time of administration.

The induction of anæsthesia is very pleasant. Usually when 4 to 6 grains have been given the patient simply drops off to sleep. Occasionally, there is a half-hearted attempt to move the arm or turn over in bed. There is, therefore, practically no secondary stage of excitation. To produce complete unconsciousness usually requires from 7 to 9 grains and rarely more than 15 grains. Under 15 grains, however, there is seldom the complete muscular relaxation necessary for surgical operations. If larger doses—15 to 22 grains—are given relaxation is more often complete, but the patient has a very long period of unconsciousness post-operatively.

In anæsthesia with sodium amytal the pupils are normal or slightly contracted. The gag reflex is present unless very large doses are given. The knee jerks are absent. Respiration becomes slightly shallower and increased in rate. There is usually little change in colour but there may be slight cyanosis or considerable blanching. Blood pressure in a normal case usually drops 20 to 30 mm. of mercury during injection and rises to normal within half an hour.

The CO_2 combining power shows no appreciable change during the anæsthetic state. There is a slight decrease in urinary nitrogen for one to two days post-operatively and the blood sugar level is slightly increased but not above the maximum normal limits in normal people.

The length of time required to return to consciousness varies with the dose given. With from 7 to 12 grains the patient can usually be roused in an hour or so after the operation is completed. With from 15 to 22 grains, he sleeps from 1 to 5 hours or sometimes even 12 to 24 hours and it may be even 72 hours with large doses before consciousness returns. However, with any one dosage the period of anæsthesia varies greatly in different subjects. The actual return to consciousness is characterized by absence of vomiting which is a wonderful boon to all patients. There may or may not be considerable restlessness during the return to consciousness which necessitates the constant attention of a nurse.

Cases in which insufficient sodium amytal has been given to produce the necessary relaxation may be given ether, nitrous oxide or ethylene in the usual way, without any additional risk to the patient. Moreover, the amount of ether, nitrous oxide and ethylene necessary in these cases is greatly reduced. Often the patient may be carried along quite easily on 50 to 80 per cent nitrous oxide.

With this short account of sodium amytal anæsthesia, I would like to tabulate some of its advantages and disadvantages. The advantages are as follows:

1. The ease of its administration from the

* Read before the Section of Anæsthesia, Academy of Medicine, Toronto, October 27, 1930.

patient's point of view; there is no stage of excitation. With this can be included the ability to induce anæsthesia in the patient's room, thus eliminating to a large degree the fear of an anæsthetic. This is of great value in nervous patients and all those apprehensive of the anæsthetic. It is particularly advantageous in hyperthyroid cases.

2. There is no post-operative vomiting.

3. It greatly facilitates the administration of nitrous oxide, ethylene and ether, if these are necessary; and the amount of these anæsthetics is greatly reduced.

4. It produces no kidney irritation.

5. It does not appreciably alter the CO_2 combining power of the blood.

6. It produces no irritation of the respiratory passages and is therefore a safe anæsthetic in lung cases.

7. In certain non-surgical cases sodium amytal has been used with success, as in persistent hiccough and for the pruritus of jaundice in which 4 grains intravenously eliminates the itching for about 4 hours; also as an antispasmodic in strychnine poisoning, tetanus, gastric crises, rabies, epilepsy, renal colic, gall-stone colic and eclampsia. It has also been used in asthma, delirium tremens, pernicious vomiting of pregnancy and severe migraine.

8. Sodium amytal greatly lessens the toxicity of the local anæsthetics, procaine and cocaine.

The disadvantages of sodium amytal are as follows:

1. The long period of time required for the patient to become conscious. This more particularly applies to cases which have been given a large dose with a view to performing the operation under sodium amytal anæsthesia alone, say, a dose of over 15 grains. Even then the patient may be roused if necessary in a few hours, but probably will not be sufficiently conscious to help himself for 12 to 24 hours and sometimes even 72 hours. In this long period of sleep he is frequently restless and irresponsible, and sometimes delirious, and requires constant nursing to prevent bodily injury or injury to the operation site and also to keep a free airway. In this period in elderly subjects special care must be taken to prevent hypostatic congestion from their lying too long in one position; also, one must be quite sure that no bladder distension occurs, and catheterization is frequently necessary. They certainly require more nursing care for 2 days after operation. The restlessness during the recovery period can usually be controlled by moderate doses of morphia. With smaller doses of sodium amytal, most of these objections disappear, but then nitrous oxide, ether and ethylene are necessary to give sufficient relaxation.

2. Inability of the patient to properly raise mucus. This also applies more particularly when the larger doses are given.

3. Sodium amytal produces a fall in blood pressure. There is normally a fall of 20 to 30 mm. Hg. In many cases, it is much greater. The operation should be postponed if the systolic pressure falls below 80 mm. of mercury. The actual fall in pressure is greater, the higher the systolic pressure is in the beginning. The fall is greater in elderly people with arteriosclerosis and in hypertension cases.

4. It is very difficult to gauge the proper dose. The inhalation anæsthetics vary greatly in the amount required to produce anæsthesia in different people. With sodium amytal there is the same if not greater variation, but here it is not practical in most cases to give more, once the operation has been started. Also there is no effective way of neutralizing any overdose. The dose required to produce the desired degree of anæsthesia varies with the age, weight and general condition of the patient, the operation contemplated, the depth of anæsthesia required, the nervous temperament and the basal metabolic rate. Generally, one may say that a patient of a nervous temperament requires an increased dose and, on the other hand, old people, those whose resistance is poor, those who have some chronic illness and have been sick a long time, and those who are apathetic or lethargic, require a smaller dose. I might add here that the best way to overcome an overdosage, as shown by circulatory or respiratory failure, is ephedrine in doses of ½ to ¾ gr. and caffeine sodium benzoate in doses of 7.5 to 10 grains plus the use of $CO_2 + O_2$.

5. There is one other disadvantage. It is occasionally difficult to enter a vein in which to inject the sodium amytal. Also, if any of the solution should enter the tissues about the vein it will produce a sore arm and possibly a slough.

CONCLUSIONS

It would seem that sodium amytal is suitable for narcosis, for light anæsthesia and for a basal anæsthesia, but alone is not satisfactory for deep anæsthesia.

It has the advantage of quiet induction; it spares the patient a great deal of preoperative apprehension; small or moderate doses may be given without injurious results. It also reduces post-operative vomiting.

On the other hand, once established the anæsthesia is, to a large extent, fixed and cannot be changed to suit changing conditions of the patient; post-operative recovery from the anæsthetic is prolonged and the need for nursing attention increased.

It seems to have a definite field of usefulness as an aid to the other general anæsthetics, but it is doubtful if it will ever take their place.

SCATTERED NOTES ON DERMATOLOGICAL PRESCRIPTIONS

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IN connection with the work of the Canadian Committee on Pharmaceutical Standards which is compiling the Canadian Addendum to the new British Pharmacopœia and a Physicians' Formulary, certain information has been gleaned in regard to some prescriptions in use in dermatology, some of which are here set forth.

Calamine has long been used in such well known prescriptions as the following:—

LOTIO CALAMINÆ

℞ Calaminæ		
Zinci Oxidi	aa	gr. xl
Glycerini		m. xx
Aquæ Calcis	ad	℥ i

UNGUENTUM CALAMINÆ

Calaminæ	℥ i
Paraffini Mollis	℥ v

Calamine was originally prepared by roasting a native zinc carbonate which was not quite pure. This roasting partly converted the carbonate into zinc oxide and also changed the iron salts present into oxides in whole or in part, producing the well known pink colour. How complete the transformation into oxides originally, was, we have to-day no means of knowing. Calamine seems no longer to be prepared from the original source, and indeed the British Pharmaceutical Codex suggests a chemical method by which an artificial product can be prepared. This product will closely resemble the calamine commonly employed in Canada. As far as we have been able to ascertain, the calamine used here claims to be prepared calamine, as defined by the National Formulary V; and tests in this laboratory have confirmed these claims. According to this authority, prepared calamine contains at least 98 per cent of zinc oxide, the remainder being iron oxides, silicates and other impurities. Consequently, when calamine is prescribed to-day, it would seem to be little different from zinc oxide.

Unna introduced a paste which contained silicious acid, and what is often termed Unna's paste is not a paste, properly speaking, but a gelatine, of which he introduced two—Gelatina Zinci Oxydati Mollis (or Zinci Vulgaris), which contained White Gelatine 15, Zinc Oxide 15, Glycerine 25, Water 45; and Gelatina Zinci Durum which contained more gelatine. The former is generally known as Unna's Gelatine or Jelly, but has undergone various small modifications. The new British Pharmacopœia will contain, under title of Gelatinum Zinci, the following formula:—

℞ Zinci Oxidi (finely sifted)	15	gr. lxv
Gelatini	15	gr. lxv
Glycerini	35	min. cxxxv or 153 gr.
Water	35	min. clxviii or 153 gr.

The great advantage of Unna's Gelatine is that while it protects the underlying parts, it is not entirely impermeable to water, owing to the considerable amount of zinc oxide and to the presence of both the gelatine and the

glycerine, and hence permits the loss of exuded water from the underlying tissue.

Whitfield's Ointment.—The original formula appears to have been that in the B.P.C. under the title Ung. Acidi Benzoici Co. The bases used were white paraffin and coconut oil. In Canada and elsewhere it is frequently made with a simple paraffin base as follows:—

℞	Acidi Benzoici	5	gr. xxiv
	Acidi Salicylici	3	gr. i
	Paraffini Mollis (alba) ad	100	℥ xiii

But we have found that these strengths are often not those required or used, and prescription by title is consequently not recommended.

Ihle's Paste.—The author has been unable to find the original formula, but under this name pastes have been described which differ considerably in composition. The subjoined is the most common form:—

℞	Resorcini		gr. x
	Zinci Oxidi		
	Amyli		
	Adipis Lanæ Hydrosi	aa	gr. cxv
	Paraffini Mollis (alba)	ad	℥ i

Ihle's Paste, owing to the large amount of zinc and starch, is protective and yet absorbent and permeable to water. The resorcin acts as a weak antiseptic.

A *Compound Lotion of Sulphurated Potash* is a frequently occurring pharmaceutical recipe with a very considerable range of variations, and in colour, consistency and properties will vary greatly with the mode of preparation. Further, there is a considerable variability in the sulphurated potash purchased by the pharmacist. Consequently, a method which will avoid the use of sulphurated potash is to be preferred. Such a method has been suggested by Dean Burbidge to the Canadian Committee on Pharmaceutical Standards, and will appear in the Formulary. It is, in essence, as follows:—

One hundred and five grains of sulphur are triturated with part of 4 oz. of solution of potash. The remainder is added, heated and filtered. One hundred and seventy-five grains of zinc sulphate are dissolved in 4 oz. 384 minims of distilled water, and filtered, if necessary. These two solutions are mixed and 150 grains of sulphur, 154 minims of glycerine, 96 minims of concentrated rose water are added, and enough distilled water to produce 10 oz.

The author can recommend from personal experience the following *hand lotion*, suggested by Prof. G. H. W. Lucas for use in cases of sunburn or chapped hands, and which is readily dispensed:—

℞	Pulveris Tragacanthæ	℥	iss
	Tr. Benzoini Co.	min.	lxxx
	Glycerini	℥	vi
	Sp. Rectificati	℥	iss
	Aquæ ad	℥	x

It is not generally recognized that glycerine of starch forms an excellent excipient for the exhibition of many skin remedies, for example, ichthyol, as in the following prescription suggested by Prof. R. O. Hurst. It is probable that ichthyol will be official in the new British Pharmacopœia under the name Ammonium Ichthyo-Sulphonate.

℞	Ichthyolis	gr.	xv
	Amyli	gr.	x
	Glycerini	min.	cxxx
	Aquæ Destillatæ	℥	ss

Nembutal "844" (Messrs. Spicer & Co., Ltd.) is a barbituric acid derivative with the constitution of sodium ethyl methyl-butyl barbiturate. The barbituric acid derivatives have been subjected to intensive research in recent years with the purpose of finding some compound suitable for use as a sedative for preliminary medication in general, spinal, or local anæsthesia. Comparative analysis of the modes of action of members of this series has revealed interesting differences in their pharmacological actions. Some derivatives are eliminated slowly from the body and produce a prolonged action, whereas others are eliminated more rapidly and produce a shorter action. Considerable variations have also been found in the therapeutic ratios (effective narcotic dose: fatal dose). Nembutal is a powerful hypnotic, but it is of the short-acting class, for recovery occurs in four hours; it is therefore particularly suitable for preliminary medication in anæsthesia. Like many others of the more complex barbiturates it hydrolyses on keeping in aqueous solution, and solutions for intravenous injection must be prepared shortly before use. The makers direct that it should be dissolved in sterile distilled water, and, presumably, it is undesirable to boil the solution. The drug has been used with success in a large number of surgical cases. The makers emphasize the necessity of following exactly the directions regarding dosage, rate of injection, etc. The drug can be given either intravenously or by rectal injection as a preliminary medication in anæsthesia.

THE METHODS AND PLACE OF PHYSIO-THERAPY IN SCIENTIFIC MEDICINE AND GENERAL PRACTICE*

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VI.

PHYSIO-THERAPY may be defined as the use of natural forces, such as light, heat, air, water, massage, exercise, etc., in the treatment of disease. Until recent years physio-therapy in some medical circles has been looked upon with a good deal of suspicion as a method of treatment which lends itself to exploitation and charlatanism. It is perhaps no compliment to ourselves, if it has virtues, to have to admit that its various procedures have been more readily used by those who have less training and skill to treat disease than we have. But if there are virtues in physical methods it is more important that we, who have the greater equipment and training should examine and know what it contains, rather than denounce it because the methods have been used by some who have not this equipment and who have possibly exploited it.

Sometimes it is said that these methods lend themselves to psycho-therapy, or that the results obtained are the result of suggestion. May we not ask ourselves if the ordinary methods of practice do not lend themselves to similar uses or abuses, depending upon whether honesty or deception is the guiding principle? We have all heard of the efficacy of bread pills, of the sterile water hypodermic, and similar methods which, when used with honest purpose and for the good of the patient, are recognized as legitimate. This particular criticism would raise the question as to how much use of psycho-therapy we are justified in applying. My own view is that psycho-therapy, suggestion, confidence in the physician, or what you like to call it, is one of the most potent factors we have in treating patients. It is not hard to measure the *harmful* effects of a psychic reaction on the system; for example, take the strong man who faints at the sight of blood, whether it is his own finger that is cut or that of a friend. What happens to him is, you will say, the result of a physical change, but you cannot deny that the physical change resulted from a purely psychic cause. If these things can happen to one's detriment how can we estimate the *beneficial* effects that sometimes follow other psychic reactions. I am sure we have all observed the buoyancy engendered by merely telling a patient, "How well you look", etc., and undoubtedly people are made to feel better by repeated healthful suggestions. I am one of those who believe that we should always take advantage of the psychic element in our patients. If anger can disturb the liver function, worry bring on indigestion, or fear, vomiting, sickness or incapacity, and the results are due to a physical reaction causing disturbance of circulation and directly affecting certain organs, may not physical effects of a reverse nature be at times beneficial, whether the action is psychological or physical in nature?

But it is, rather, the physical effect of physio-therapy that I want to discuss. There are two kinds of body conditions which we have to consider. These I would classify as (1) disturbed function only, and (2) disturbed function involving a pathological state; the former more or less a disturbance of circulation without destruction of tissue or actual localization of disease germs; the latter, physical change from localization of disease germs, or destruction of cell tissue by disease germs, toxins or injury. In either case healing depends upon the blood, its quality and quantity, either increased or diminished.

The intelligent conception of the disturbance

* This is the sixth article in the series being published on physio-therapy. For the preceding articles see *Canad. M. Ass. J.*, 1931, **24**: 263, 409, 539, 679 and 831.

in a part, and an idea of the effect of the reagent on that disturbed process are necessary to intelligent and successful treatment. This is equally true whether the reagent is medicinal or physical. We must ask ourselves what is the condition present, and, particularly, is it disease or trauma, or is it a combination of both; finally, is it acute or chronic? Pain here must be considered, as this is usually the symptom calling for relief, and, barring exceptions, it may be said that "pain" means "pressure." The pressure again is either positive, as in acute cases and trauma, with an excessive blood supply, or negative, with constriction as in chronic cases, but still it is pressure and it is pain. Then we can further ask. What have I at hand to remedy it? If we use entirely medicinal remedies we must learn by teaching, experience or experiment how to use them on a certain condition. Sometimes one drug may not give the effect we want. We will try another, and so it is with physical remedies. You must learn how to use them; you must judge their effect; and it is my experience and belief that it is easier to assess the value of many physical measures than that of some medicinal.

Much as I appreciate the value of psychotherapy, where you have a real pathological process the mere use of physio-therapeutic methods will not carry you or your patient far, unless that agent is used which will effect the necessary physical change; an agent the use of which is based on the pathology, and one which will tend to the relief of symptoms and to healing. Should a condition be largely *functional,* and the subject amenable to psychotherapy, your physical methods may supply the necessary stimulus.

Physio-therapy is not a new method, it has been used during all time. It is more a question for us to consider how and in what way newer methods of application may be helpful. For example, the beneficial effect of sunlight is as old as history, but are its advantages or is its applicability made more general by the use of the quartz lamp; or, in regard to the application of heat, have the incandescent lamp, the infra-red ray, or diathermy advantages over the stove lid or the poultice; or are some of the later hydrotherapeutic methods better than the hot fomentations; or will an erythema from ultra-violet light replace that of the fly-blister? And so on.

What is the physiological effect of physical treatment? I look upon physical therapy as merely one arm of medical or surgical therapeutics, and each may supplement or aid the other. We must avoid becoming over-enthusiastic. We should think of any method as a therapeutic aid and not as a treatment in itself. For example, I have had patients consult me who had been having physio-therapy for long periods, with only 60 per cent of hæmoglobin, a consideration that was overlooked. That is the result of over-enthusiasm and lack of balance. If you use physio-therapy use your other knowledge and your common sense too. If you use quartz light as a counter-irritant in a sciatica, or sedative massage in the same to relieve it, do not forget to examine the patient for the possible cause. This may be toxic from focal infection or may be due to injury of the pelvis, bony anomalies, or errors of diet or habits. In fact, to be blunt about it, no matter what methods we apply, there is no substitute for brains.

There are, of course, certain methods of physio-therapy, such as those involving x-ray and radium, which, owing to the large outlay and the technique necessary, require specialization. We will, however, examine some of the simpler and more readily available forms and see if they can help. I can discuss best only those that relate to my own practice of orthopædics, including various joint, muscle and nerve injuries, chronic arthritis, and concurrent conditions that come with them.

DIATHERMY

Here we use a high frequency current of over 100,000 oscillations per second so that muscle tissues do not contract on its application and the only effect is heat. The heat is produced by the resistance of the tissue to be treated, as it is placed between the two electrodes. The heat regulation mechanism of the body responds with a local hyperæmia, which means more blood—phagocytosis is stimulated, stasis is relieved, scar tissue and many deposits are made soluble and removed. The action of the heat and hyperæmia on the sensory nerves is very sedative and is thus often an effective anodyne. In this way it has a wide application in chronic

lesions resulting either from disease or injury, particularly those around joints. Where deposits are old and of long standing the process of cure is slower, but it is effective.

One of the most promising indications for diathermy is in recent injuries. Take as an example a badly sprained ankle. It is painful, swollen, and œdematous, and it may be hæmorrhagic. If we see it at once we like cold applications and a bandage. Why is this? To minimize hæmorrhage and stop exudation and give support to the injured tissues. We know if there is much exudate it ultimately has to be carried away by the blood and lymphatics; we know if it remains there it becomes organized fibrous tissue and the process of removal is slow—so slow that there are many such who after weeks or months apply for relief. Except where there are adhesions limiting function which must be broken down, diathermy with massage is the most effective means of relief we can offer.

But we have seen that diathermy causes an active hyperæmia and it is sedative to the sensory nerves. Therefore if diathermy is applied as early as possible after an injury—as soon as the action of cold has influenced the initial active hæmorrhage—a large part of the exudate is removed before it is organized and there is almost immediate relief of pain. If the treatment is continued daily there is no residual swelling and fibrosis. A patient so treated is usually more fit in a week than he would be in a month without it. Of course, in the interval you will do the obvious thing and keep the torn ligament from strain by suitable support,—adhesive strapping and a bandage being usually sufficient. The same applies to fractures about joints, if a few treatments may be given without displacement occurring, to deal with the swelling only. Diathermy does not promote union; it may even delay it. There are many uses for diathermy and, as I have already stated, in the chronic neglected lesions it has wide application. You should learn more about them.

QUARTZ LIGHT

This is the other measure most easily applied and likely to be of most use in general practice. If you believe sunlight is good, then so is quartz light. I do not say it is as good as sunlight,—it is only part of sunlight—but you can have it in the season when but little sunlight is available. It may be used as a general exposure for general effect, or for local effect. You must get acquainted with your lamp and know what it will do. As a general measure it has an undoubted tonic effect on the whole system, and after a few treatments a feeling of well-being is experienced. Its effect in rickets is well known. Some of the established effects of quartz light may be summarized. It is bactericidal; it increases the calcium and phosphorus in the blood; it enhances leucocytosis; it produces pigmentation of the skin, which is protective; it is a metabolic stimulant; it is a counter-irritant.

Locally, as a counter-irritant in neuritis the quartz light is often very effective and may be used to replace the fly blister. The dose sufficient to give a moderate sunburn is very effective. It is used with great advantage in certain skin diseases and has a wide use in superficial infections, ulcers, etc. I use it regularly in conjunction with diathermy in chronic sinuses of either tuberculous or pyogenic origin and have learned to respect it highly as an aid to other treatment in various combinations. Learn its uses and it may be made a great friend. It may also be abused, and that is what you must learn to avoid.

THE GALVANIC CURRENT

I use this largely in the form of ionization, for its effect on chronic joints and scar tissue. Its process of action is not so easily explained as diathermy, but the results are not second to it. We know that the cathode softens tissue and the anode contracts and we must visualize our pathology and use the current accordingly. It is a useful physical method and there are various books that describe its application in detail (see bibliography). The galvanic current in its modifications as the sine wave, interrupted direct current, has various uses, in muscle toning and stimulation in various forms of paralysis, such as poliomyelitis and other nerve lesions, and in muscle injuries. We find abdominal application very helpful, along with colonic irrigations and other aids in overcoming the chronic constipation which accompanies, or is possibly a cause of, some of the most persistent forms of chronic arthritis.

THE FARADIC CURRENT

Mainly in the form of the Bristow coil[4] this is used to stimulate weakened muscles where the nerve is intact but may have been injured or weakened by disuse. For example, I have frequently seen disabilities about the shoulder, where the patient was unable to raise his arm, that were cured in from one to five treatments. In fact, the patient is often quite startled and surprised to find that after a few contractions have been effected by the faradic appliance he can himself raise the arm. The nearest explanation I have is to compare the nerve to a damp wire on your car. It will not carry a weak current, but a stronger one gets through, and so, when the resistance in the injured nerve is overcome by the passing of the faradic current, it will shortly transmit its own impulse. We use the same method in building up the quadriceps action following knee operations and injuries. The response in the muscle is most definite and is a most effective method of shortening a convalescence. There are many such indications for its use in our patients and I think this may suggest some indication for its use in general practice.

RADIANT HEAT

This has a very general application and should precede massage in most cases where massage is given, such as in injury limited to muscle, or superficial tenderness of a nature not requiring diathermy. It should receive universal consideration, as it is useful even in the common cold.

MASSAGE

In my work this is the backbone of all physio-therapy. It supplies the finishing process to most of the treatments and is most valuable for its physical effect, but as well it calls for that personal attention which has a satisfying effect on any patient. It gets him away from the feeling of being "machined through," as it were.

The last consideration is how to furnish these aids. The appliances cost money, the treatments take time, and must be given by a technician or nurse who should be also trained in massage. I could not have the patience nor the time except to direct, neither has the general practitioner. In the larger centres a sufficiently large clinic may be developed by one who devotes his time to nothing else and many such specialists find it necessary to employ assistants. In the smaller places you should have these aids. I think possibly by jointly establishing and controlling a treatment centre where a technician could carry out the treatments under your direction you would soon learn their application with benefit to both yourself and your patients. When the principles are understood, the rationale becomes sound and in many instances the effect can be demonstrated much more definitely than can the effect of many of the medicinal remedies and various other methods.

I might enumerate other methods and other ailments amenable to them, but I believe I have said sufficient to indicate that there is something for us in physio-therapy, and that we should learn more about it and how to apply it. In closing may I emphasize that these treatments should be given only under the direction of medically trained men, men who can select the best methods without exploitation, men who will not forget that they are physicians first and that physio-therapy is not a treatment in itself but merely a great addition to the art of treatment.

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THE SPLEEN.—"This member hath a propertie by itselfe sometimes, To hinder a mans running: whereupon professed runners in the race that bee troubled with the splene, have a devise to burne and wast it with an hot yron. And no marveile: for why? they say that the splene may be taken out of the bodie by way of incision, and yet the creature live neverthelesse: But if it be man or woman that is thus cut for the Splene, hee or shee looseth their laughing by the meanes. For sure it is, that untemperate laughers have alwaies great splenes."—Pliny, trans. by Philemon Holland (1601).

As regards the last part of the quotation it will be noticed that Pliny is a little muddled, as is indeed often the case, for on the hypothesis of the four humours it is the melancholics who should have great spleens, and not the laughers. There is a well-known tradition that the spleens of Greek runners even in the earliest times were removed to increase their speed and endurance.

ECLAMPSIA AND PRE-ECLAMPTIC TOXÆMIA OF PREGNANCY*

By KENNETH C. McILWRAITH, M.B.,

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THESE names, eclampsia and the pre-eclamptic toxæmia of pregnancy, have been commonly applied to a large series of cases. Many signs and symptoms occur—œdema, high systolic pressure, albuminuria, with or without casts, hæmaturia, vomiting, even hæmatemesis, headache, rapid increase in weight without œdema, severe epigastric pain, dimness of vision, complete amblyopia, retinal hæmorrhages, cerebral hæmorrhage, neuroses, anæmia, jaundice, convulsions, coma and death. The majority of the patients show in the initial stage, œdema, high blood pressure and albuminuria, and these may be taken as the typical signs. Any large group of patients so marked out may again be divided clinically into various classes as follows.

Chronic nephritics.—These women show thickening of the radial or temporal arteries, changes in the fundus oculi, anæmia and the nephritic facies. There is often a history of numerous pregnancies, some of them with similar trouble, or of severe illness of a kind apt to leave kidney damage. The trouble tends to recur with each pregnancy. The course is perhaps rather towards intra-uterine death of the fetus and miscarriage than to convulsions. Intra-uterine death of the fetus causes no sudden improvement as is the case in other classes. The patients are usually women well on in the child-bearing period, but a surprising number are young girls of from 18 to 22. Some of these have conceived before complete recovery from the nephritis following an acute disease. Most of them give no such history and are apparently congenital nephritics. In many of these women the diminished renal reserve is disclosed only by pregnancy and not by any of the usual clinical tests.

Nephritic toxæmia.—The patients in this class are usually young primiparæ showing the three typical signs and nothing else—no anæmia, no arteriosclerosis, no fundal changes, no fever—and giving no history of any severe illness. In three cases I have found *Staph. aureus* persistently present in the urine. Whether this has any clinical significance I do not know.

Infective nephritis.—Here the patients are similar to those in Class 2, but showing occasional rises of temperature, and perhaps anæmia. *Staph. aureus* or streptococcus appears in the cultures from the urine. If this trouble could be shown to be limited to one side, nephrectomy might cure. Otherwise the prognosis is bad.

Essential hypertension. — Here high, often very high, systolic pressure dominates the scene. Œdema and albuminuria are often absent entirely, or occur slightly on occasion. These women, with care, go through several pregnancies; occasionally they succumb in severe cases.

The hypothyroid type.—This occurs generally in full-bodied women who have enlargement of the thyroid. The œdema is harder than usual; the basic metabolism is low. The trouble shows early and may be controlled by appropriate doses of thyroid extract.

The hepatic type.—Here the trouble shows itself suddenly in the latter end of pregnancy, with convulsions, coma and death.

When women place themselves under the care of a physician, and are supervised during pregnancy, their trouble can always be detected early and their lives saved in the great majority of cases, unless they belong to groups 3 and 6. These two types are fortunately rare, yet in many statistics eclampsia or albuminuria of pregnancy are credited with anywhere from 20 to 30 per cent of the death rate!

* Read before the Section of Obstetrics and Gynæcology, Academy of Medicine, Toronto, November 6, 1930.

TREATMENT

How, then, are these troubles to be overcome? A chronic nephritic should be treated according to the severity of her symptoms. If the eye signs are absent, the systolic blood pressure under 170, and the symptoms stationary or diminishing under treatment, she may be carried on, under care, until the period of viability is reached, and labour may then be induced. Viability is sought for the child's sake, and the pregnancy terminated for the mother's, to avoid increasing damage to her kidney reserve. The child, too, may die *in utero* if the attempt is made to carry it to term. By "care" is meant rest in bed under a salt-free diet, with a careful attention to elimination by the bowel. A reasonable amount of protein does not seem injurious; neither does water, if its excretion is well maintained. A careful daily record of bowel movements, urine excretion, percentage of albumin, and blood pressure should be kept, and if the report is adverse the pregnancy should be terminated irrespective of viability. Salt is always injurious to these patients and their diet had better be kept entirely free from it. If the state of chronic nephritis is well established the patient should be sterilized. Sterilization *might* be safer if done three months after a a natural birth, but our hospital patients sometimes do not return for the operation, or become pregnant before it is time for it. It would seem wiser therefore to terminate the pregnancy by Cæsarean section combined with sterilization. In a woman near the menopause x-ray sterilization may be satisfactory. In a young woman it is only temporary, or, if complete, brings about a premature menopause.

Nephritic toxæmias are treated in the same way as chronic nephritics, but sterilization is not advised, as the condition *may* not recur in a future pregnancy. The patient is kept under observation until she is quite well, and advised to place herself under care of her physician at once should she again become pregnant.

About the cases of infective nephritis I can say no more. The essential hypertension cases should have comparative rest and salt-free diet. Termination of pregnancy is only resorted to in the case of adverse developments. These patients usually do well. The hypothyroid condition yields to thyroid treatment. The hepatic type is generally, but not always, fatal. One woman I saw, in her sixth month, who developed confusion of intellect one morning with a slight jaundice. By noon the signs had increased, and by evening the jaundice was deep and she was becoming comatose. I did a Cæsarean section, and she recovered rapidly. I understand that she has had two children since without toxæmia. If a patient is not seen until she is in convulsions we use the Stroganoff treatment, terminating the pregnancy as soon as improvement takes place. It is not safe to try to carry on a patient who has once reached the convulsive stage.

A word may be said about nomenclature. In some clinics the chronic nephritics and nephritic toxæmics are not referred to as pre-eclamptics or eclamptics. Some do not commit themselves to a diagnosis until the patient is dead and an autopsy been held. Again the autopsy has occasionally been found to refute the diagnosis. In any event I am satisfied that the distinctions I have drawn exist, and I trust you may find them helpful in practice.

INDISPENSABLE USES OF NARCOTICS: NARCOTICS IN SURGERY.—Elliott C. Cutler and John W. Holloway state that surgeons are concerned only with drug addiction due to cocaine and morphine. All the cases that they have seen, as well as much of the material published, lead them to look on the "addict" as an individual with a perverted and degenerate personality, although obviously certain reservations must be made. Nevertheless, their views are rather fatalistic about such personalities. Still it behooves surgeons to share in the general and desirable effort to keep habit forming drugs from such individuals. Cocaine needs no further comment. Its use is justified only in surface applications. As to morphine, they believe that from the standpoint of the surgeon it is the most valuable drug in the pharmacopœia, that it is essential in trauma and in certain very painful crises, that it should seldom be administered until a diagnosis can be made, and that in the preoperative and postoperative care of patients its use may be reduced by a proper study of substitutes.—*J. Am. M. Ass.*, 1931, **96**: 857.

Clinical Conferences

RECURRENT TOXÆMIA IN AN ELDERLY MULTIPARA WITH PERSISTING HYPERTENSION

BY ROSS MITCHELL, M.D.,

Winnipeg

MRS. A.K., aged 46, Russian, complains of frequent headaches and fatigue. She is presented on account of her last three pregnancies having been complicated with toxæmia, and, as she now has a systolic blood pressure persistently over 200, it is reasonable to suppose that these attacks of toxæmia may have been responsible for her present condition. Although with each of the three last pregnancies she had marked albuminuria with occasional casts, recent tests fail to indicate the presence of chronic nephritis. It is an interesting speculation, however, how long she can carry on with such a hyperpiesis before the kidneys show signs of impairment. One is forced to appreciate the truth of Gibberd's dictum: "Pregnancy is the most delicate test of renal efficiency."

Her father and mother died in Russia at the ages of 65 and 63 from debility following war starvation; her brothers and sisters are healthy. She has had pneumonia and a severe burn of the right arm and shoulder from blazing floor wax in 1920. The scar on the arm was excised at the Winnipeg General Hospital in the following year by Dr. Gibson with good results. All her teeth have been extracted and she wears dentures. As a result of her numerous pregnancies she has marked varicose veins on both legs. Her Wassermann reaction is negative.

Menstruation began at 18. She was married at 22 in 1906, and came to Canada three years later. Her menstrual periods last five days; the flow was scanty before marriage, profuse since. She has had nineteen pregnancies; sixteen children were born living, of whom eleven survive. All her deliveries took place at home with the exception of the last three, and all were natural except the last four. The first of these four deliveries was prolonged and was terminated with forceps. No records of any but her last three pregnancies are available, but she states that she was well until September, 1924.

On October 1, 1924, being then about seven months pregnant, she was admitted to the Winnipeg General Hospital with failing vision, headache and œdema. Her blood pressure was 232/126. The urine contained 0-9 per cent albumin, with a few granular casts, and 1.9 per cent urea. Her fundi were examined by Dr. Harvey Smith and found negative. Sixteen ounces of blood were removed by venesection, but she had two convulsions. On October 2nd, her blood pressure was 215/125; blood urea nitrogen, 21.0 mg. per 100 c.c.; blood creatinin 1.6 mg. On October 4th, after consultation, Dr. J. D. McQueen ruptured the membranes, and on the 6th she was delivered of a stillborn fetus weighing 2 lb. 12 oz. She continued to improve, and on October 25th, when her blood pressure was 150/110, she left hospital against advice.

In January, 1927, she again became pregnant, her expected date being October 25th, and throughout the pregnancy had much distress, particularly after quickening, with backache and frequency of urination. From August 1, 1927, she attended the prenatal clinic of the hospital. She had constant aching in the right hypochondrium, associated with daily attacks of crampy pain lasting five minutes or more. She also had œdema and dyspnœa on exertion. On September 12th, the œdema was more marked; her blood pressure was 158/116. On September 15th the blood pressure rose to 195/115; the urine, previously clear, showed a trace af albumin; she had abdominal pain, dizziness and flashes of light before her eyes. She was therefore admitted to hospital.

On admission she was put to bed between blankets and given water only. Colonic irrigations of normal saline were given b.i.d. On September 17th her blood pressure was 220/120. She felt dizzy and hot. Examination of the eye-grounds showed congestion of the vessels and blurring of the discs, but no definite retinal hæmorrhages. At 7.45 p.m., 20 c.c. of 10 per cent magnesium sulphate was given

intravenously, and the same amount at 10.45 p.m. Her blood pressure dropped from 220 to 175 (systolic). Meltzer, in 1915, and others have shown that magnesium salts have an anæsthetic action on the central nervous system. H. J. Stander, from experiments with dogs, states that the dose should not exceed 0.1 g. per kilo of body weight. In his opinion magnesium sulphate should not be administered intravenously in concentration much exceeding 10 per cent, as a 25 per cent concentration proved fatal in some dogs. Lazard thinks that intravenous magnesium sulphate reduces cerebral œdema and, by increasing the aqueous content of the blood, increases diuresis, overcoming kidney block and relieving toxæmia.

On September 17th and 18th our patient was nauseated and vomited. On the 18th she received 20 c.c. of 10 per cent Mg. SO_4 solution at 11.30 a.m., and at 2.30 p.m. 20 oz. of blood were drawn from a vein. At 8 p.m. her condition was only fair. On September 19th at 9.15 a.m., two bougies were inserted into the uterine cavity between the membranes and the wall of the uterus. At 9 p.m. 8 oz. of blood were withdrawn and 20 c.c. of 10 per cent magnesium sulphate given intravenously. At 9.40 p.m. her blood pressure was 165/80. From 1.30 a.m., September 20th, she had irregular pains and at 6.30 a.m. she delivered herself of a male child weighing 5 lbs. 9¾ oz., about five weeks before term. The condition of mother and child was fairly good. At 11 p.m. magnesium sulphate in similar dose was given intravenously, and also at 1 p.m. and 11.40 p.m. on September 21st. Colonic irrigations were given once daily until October 1st. Soft solid diet was allowed on September 25th and 26th, but a severe attack of indigestion caused a return to water diet, which was continued to the time of her discharge from the hospital on October 3rd. The urine continued to show a trace of albumin until October 2nd.

On October 20th she reported at the postnatal clinic, when her blood pressure was 135/90.. There was an old bilateral laceration of the cervix with endocervicitis, cystocele and rectocele, and an old extensive laceration of the perineum. She was advised to have a general repair, but this advice has not been followed.

In March, 1929, she again became pregnant. On June 3rd her blood pressure, taken in the medical clinic, was 190/110. She was advised to rest and was put on a low protein diet. On June 7th her total day urine measured 530 c.c., with specific gravity 1027, and the total night urine, 410 c.c., specific gravity 1027. On June 8th her blood pressure was 250/120. On June 15th she had some vaginal bleeding without pain. From this time, however, she noticed that there was no further enlargement of the abdomen. On August 19th, five months from her last period, she had further bleeding, this time with cramps, and on August 20th she sought admission to the hospital. Her blood pressure on admission was 168/88, and there was a trace of albumin in her urine. In the operating room a three months' ovum was found lying in the dilated cervical canal and was removed. Convalescence was without incident and she was discharged on August 27th.

Looking back over this pregnancy it appears that toxæmia manifested itself in June when she was three months pregnant, and increased in severity until the ovum perished about June 15th, when she had bleeding. Death of the ovum produced amelioration of symptoms and two months later the uterus attempted to expel the dead ovum.

On November 23, 1930, her blood pressure was 214/140. On December 15, 1930, the day urine was acid, had a specific gravity of 1015, and contained no albumin and was microscopically negative; the night urine was acid, its specific gravity 1030, with no albumin. On January 27, 1931, her blood pressure was 208/120. On February 2nd her blood urea nitrogen was 18 mg. per 100 c.c. of blood, and on February 6th, 20 mg. per 100 c.c. The urea concentration test from specimens taken in the early morning after fasting showed 1.8 per cent and 2.4 per cent, respectively, in the first and second hour specimens, with specific gravities of 1014 and 1023.

With these blood and urinary findings in a woman, who, despite her complaints of headaches, carries on the multitudinous duties of a mother of a large family, one would hesitate to make a diagnosis of a chronic nephritis, though undoubtedly she has hypertension which causes symptoms. It is reasonable to suppose that the strain of repeated pregnancies has proved too much for her liver and kidneys, causing grave crises in her last three pregnancies in 1924, 1927,

and 1929, with only one fetus surviving. Although our present tests of renal efficiency fail to show up in her at this time any kidney defects there is little reason to doubt that another pregnancy, still a possibility, since she menstruates regularly, would be attended with a recurrence of toxæmia. It is probable that the hypertension will, after several years, lead to arteriosclerosis of the kidneys.

Dr. Daniel Nicholson, Assistant Professor of Pathology, University of Manitoba, has performed most of the recent examinations of the blood and urine, and his kindness and ability are gratefully acknowledged. I am also indebted to Dr. John McEachern, of the Out-Patient Department, Winnipeg General Hospital for cooperation in the examination.

Case Reports

SUDDEN DEATH WITH SALYRGAN

BY I. J. WOLF, M.D., AND
H. D. BONGIORNO, M.D.,
Paterson, N. J.

The following case of nephrosis is reported because it is apparently the first fatality with the use of salyrgan as a diuretic.

James de M., aged 4, of Italian parentage, was admitted to the St. Joseph's Hospital with complaint of oliguria and œdema. He had had diarrhœa at 3 months, which lasted several weeks, and whooping cough at 2 years. The history otherwise was negative.

The patient was first noticed to be œdematous when a year old. Œdema recurred about every six months, affecting the face and extremities, sometimes the abdomen. The present illness dated from about the middle of December, 1930. The urine was never blood-tinged, except during the administration of hexamethylenamin three weeks before admission. This disappeared when the drug was discontinued. He had an occasional "cold", and, about a week before the onset of the present illness, a sore throat. There was no history of headache or vomiting, except when he had a sore throat.

The father and mother were both well. The paternal grandparents both have sugar and albumin in the urine, and a high blood pressure.

Examination.—The patient was sitting up in bed. His face was pale and slightly œdematous; there was much œdema of the legs, scrotum and abdomen. Examination of the head and neck was negative. The heart was not enlarged, the sounds not accentuated. The blood pressure, taken on numerous occasions, was about 118 systolic, 90 diastolic. There was no fluid or moisture at the lung bases. The superficial veins of the upper abdomen were dilated, and the umbilicus pouting. No tenderness was elicited.

Laboratory findings. — The urine varied in specific gravity from 1.012 to 1.030; albumin 3 plus; sugar negative; numerous hyaline casts and a few granular ones; many renal epithelial cells; no microscopic or chemical blood in daily urines. The quantitative albumin varied from 1 per cent to 4.5 per cent. The blood count showed a moderate secondary anæmia. The blood non-protein nitrogen, taken on four different occasions, showed an average of 37 mg. per cent; the blood creatinine taken on admission, 1.5 mg. per cent; the blood cholesterol, 260 mg. per cent. A blood Wassermann test was not done. The kidney function test was unsatisfactory because the patient did not void.

Treatment.—The patient was placed on a salt-free, high protein diet of 900 calories. After ten days a regular, salt-free diet was substituted. The fluid intake was restricted to 600 c.c. for the 24 hours; this was not successfully carried out until the latter half of the patient's stay in the hospital. Enough magnesium sulphate was given to ensure a daily, watery bowel movement. Ammonium chloride, 10 grains, was given every four hours. The drug was discontinued from time to time for short intervals. It caused vomiting when first administered. On February 6, after twelve doses had been given, 0.3 c.c. of salyrgan was administered intravenously. The resulting 24-hour urinary output was 210 c.c.

Course.—There was a daily afternoon rise in temperature, never exceeding 101 degrees. The morning temperature was normal. The daily urinary output ranged from a few to 400 c.c. On February 9, 0.7 c.c. of salyrgan was given by the usual route; on February 13, 1.0 c.c. The next day the patient received 1,000 units

of diphtheria antitoxin intramuscularly, because of an outbreak of diphtheria in the ward. The basilic veins at both elbows were used for intravenous administration of salyrgan. On one occasion blood was taken for a non-protein nitrogen determination immediately after salyrgan had been given, without withdrawing the needle or removing the tourniquet. The salyrgan injected was seen to flow back into the syringe followed by blood. As it was believed that the patient had received none of the drug another dose was administered on the other side. The patient complained of no pain at the site of injection on the side the salyrgan was lost, nor did any local swelling or inflammation occur.

Salyrgan was discontinued temporarily because it was being poorly excreted. Theocin was pushed in full doses without diuresis. A fourth dose of salyrgan (1 c.c.) was given February 22nd. The patient was discharged and a similar routine was followed at home. Here the fluid intake was restricted to 200 c.c., and the patient voided as much as 600 c.c. without progressively diminishing the œdema. On March 3rd, 1 c.c. of salyrgan was given. This was followed by a chill in about an hour, and a rise of temperature to 102 degrees. The next morning the temperature was normal; the appetite was poor; the patient was listless, and a blotchy rash resembling measles was seen on the face. The tongue was coated white, the gums were normal, and the throat injected. In the next two days the rash disappeared and the patient was brighter. The diuretic response in 24 hours was 2,250 c.c. Encouraged by the diuresis, in face of the reaction, a sixth dose of salyrgan was given a week later, March 10th. The drug was administered slowly. As the needle was withdrawn, the patient coughed, uttered a cry, and fell dead. A post-mortem was not obtained.

DISCUSSION

Merbaphen (novasurol), which preceded salyrgan as a diuretic by several years, was introduced in 1920 by Saxl and Heilig.[1] The toxic effects of this drug, observed by many since its introduction, have been summarized by Snell and Rowntree,[2] who reported purpuric manifestations due to its use. "These have been in general indicative of mercurial poisoning, and include stomatitis, diarrhœa, and renal irritation; minor toxic symptoms, such as slight fever, chills, malaise, and headaches, are common, but more severe reactions are relatively rare. Marvin[3] has described something resembling a state of shock with chills, sweating, cyanosis, collapse, and occasionally urinary suppression following its use. Deaths have also been attributed to the drug,[4] not only when used as a diuretic but as a remedy for syphilis. Zeiler,[5] who had given 5,000 injections of merbaphen to about 900 syphilitic patients, noted eruptions of the skin resembling those of the acute exanthemata (measles and scarlet fever) in 0.6 per cent of the cases. Several observers have noted hæmorrhagic lesions in the intestines with bloody diarrhœa; the latter has not been uncommon in our experience."

On the other hand, few references are found in the literature concerning untoward effects of salyrgan. The drug has been known to be relatively free from toxicity and for this reason has largely replaced merbaphen. Salyrgan has been used in many instances twice a week for as long as a year without harmful effects.[6] Of course, if the drug is poorly excreted, mercurialism may result. Our patient exhibited many of the toxic symptoms reported for merbaphen. The daily afternoon rise of temperature would be augmented, followed by malaise. The injection which preceded the fatal one caused chills and fever, a morbilliform rash, anorexia and malaise. This resembled the state of shock referred to by Marvin.

Hyman and Hirshfeld[7] have described a syndrome called "speed shock", resulting from the rapid intravenous injection of any molecule. They have shown the reaction to be independent of the "nature of the agent, its dose or concentration, or the functional state of the animal; the pathogenesis appears to be similar to that found in anaphylactoid phenomena, the post-transfusion chill, the nitritoid crisis, protein shock and allied conditions."

Gammel[8] described the occurrence of arterial embolism following the intramuscular administration of bismuth, and other salts of the heavy metals. Clinically, there is a diffuse painful swelling of the gluteus, and a bluish red, net-like discoloration, with subsequent necrosis of the central part. On histological examination, emboli of the injected drug were seen in the

cutaneous arteries. Thirty similar cases have been reported in the European literature, according to Gammel.

A case of embolic thrombosis of the superficial tissues of the palm of the hand following intravenous injection of salyrgan was reported by Morian.[9] The patient, aged 26, suffering from decompensation, had received 80 injections of salyrgan previously, some intramuscular, some intravenous. A vein at the left wrist was used because those at the elbows were blocked. When two-thirds of the dose had been given, the patient complained of severe pain in the hand and burning at the site of injection. The rest of the dose was given when the physician assured himself that he was in the vein. The pain increased and the hand and forearm began to swell. Three hours later he was admitted to the hospital, on September 29, 1928. The site of injection was seen to be overlying the radial pulse. This area was blue; the forearm was swollen; the veins full, and the first four fingers cyanosed. During the next few days mummification of these fingers occurred. About a month and a half later, amputation above the wrist was performed under local anæsthesia. The patient recovered and subsequently received salyrgan again intramuscularly for his œdema, without ill effect. He died January, 1929, of cardiac failure. Anatomically, the ulnar artery was thrombosed; the radial artery was free, except for a superficial branch, although the adjacent tissue of the site of injection showed extravasation of blood, inflammation and necrosis. The first four digital arteries were also thrombosed. The heart valves were scarred and showed a verrucose endocarditis. There was an embolus in the right vertebral artery, and the kidneys showed the scars of old infarcts. Microscopically, the oldest thrombus was in the ulnar artery. Morian believes that embolism of the ulnar artery must have occurred simultaneously with the injection of the salyrgan. That the patient was prone to embolism was seen at post-mortem. He believes it unlikely that the radial artery was injected, because of the skill of the physician who administered the drug. Leakage of the salyrgan was the cause of the pain at the site of injection, and the subsequent necrosis.

COMMENT

The dislodgement of an embolus as the immediate cause of death, is a possibility in our patient. However, at no time was there any evidence of infiltration or thrombosis at the site of injection. The reaction (chill, fever, rash) which preceded the fatal one suggests that the cause of death was, rather, an anaphylactoid phenomenon. As concerns "speed shock", the salyrgan was injected as slowly at the fatal administration as at any other.

SUMMARY

A case of nephrosis is reported in a boy of 4 years, who received six doses of salyrgan intravenously. Each administration was usually followed by an augmented rise in the afternoon temperature and malaise. The resulting urinary output was poor. The injection preceding the fatal administration was followed by chills, fever, a morbilliform rash, anorexia and malaise. The sixth dose caused sudden death. Although the dislodgement of an embolus is possible as the cause of death, the authors believe that the death was an anaphylactoid one. No post-mortem was obtained.

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ANÆMIA FROM DIBOTHRIOCEPHALUS LATUS

BY EDWARD S. MILLS, M.D.,

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The following case of infestation with dibothriocephalus latus is of unusual interest because the clinical features, including achlorhydria, were those of pernicious anæmia, and because the blood and the gastric contents returned to normal after removal of the parasite.

L.T., (6589-30) a Finlander, aet 25, came to Canada three years ago and had been living in Quebec since his arrival. He was a labourer, single, of good habits, and gave no venereal history. He denied any illness prior to the onset

of the symptoms for which he sought relief. He had never to his knowledge passed segments of a tape worm. Owing to linguistic difficulties it was impossible to ascertain the exact date of the onset of his illness. The pallor had been gradual and progressive over a period of six or seven weeks. The man first noticed weakness, palpitation and dyspnœa on exertion about four weeks prior to his admission to the hospital. There had been some vague epigastric distress, but the usual train of symptoms met with in patients with achylia was not elicited. He was admitted to the medical service of Dr. C. A. Peters, to whom I am indebted for permission to publish this case.

Physical examination.—Weight 133 lbs.; temperature 100°; pulse 106; respirations 22. The pallor of the skin and mucous membranes was extreme and of the sub-icteroid type. There were no petechiæ. The lungs were clear. The lymphatic system was normal. The heart was not enlarged but there was an apical systolic bruit. The blood pressure was systolic 115, diastolic 65. The liver could be palpated at the costal margin, but the spleen was not felt. The reflexes were normal, and there was no alteration of two point discrimination or vibration sense.

The laboratory data were as follows. The urine was normal. An Ewald test meal showed no free hydrochloric acid in any fraction, and a total acidity of 16. The blood Wassermann test was negative. A blood examination showed: red blood cells 910,000; white blood cells 5,600; hæmoglobin 22 per cent; colour index 1.2; diameter of red blood cells 9.9 microns; platelets 88,000; reticulocytes 0.8 per cent; differential count showed polymorphonuclears 23 per cent, lymphocytes 58 per cent, eosinophiles 5 per cent, myelocytes 5 per cent, metamyelocytes 5 per cent, and degenerated cells 6 per cent. The van den Bergh reaction showed 3.0 units. The red cells were of the macrocyte type, large, with abundant hæmoglobin. Basochromia of the diffuse type was noted, though stippled cells were not abundant. Four normoblasts were met with in counting a hundred leucocytes. Urobilinogen was present in the urine in a dilution of one in twenty-five.

Diagnosis.—Largely because of the patient's age and nationality, fish tapeworm infestation was at once suspected. Examination of the stool confirmed the diagnosis. A vermifuge (male fern) was given and the worm recovered, though the head was never demonstrated. With the removal of the parasite the anæmia rapidly disappeared, and two months later the blood values were practically normal. At this time free hydrochloric acid was present in the gastric contents in practically normal amounts.

The Table below gives a brief summary of the clinical course.

An interesting feature of the case was the character of the anæmia. It was not only of grave proportions, but simulated pernicious anæmia in practically every respect. The colour index was high, the leucocytes reduced at the expense of the polymorphs, the platelets below normal, and diameter of the red cells extremely large. The plasma bilirubin was also elevated. Achlorhydria, the *sine qua non* of pernicious anæmia, was also demonstrated, though no post-histamine test was made. The case is however not unique in these respects. Anæmia simulating pernicious anæmia is well recognized in infestation with dibothriocephalus latus though it does not by any means always occur. During ten years only four cases of diphyllobothrium infestation were admitted to the Montreal General Hospital. Of these only two, the pres-

TABLE I

Date	*R.B.C.*	*W.B.C.*	*Hgb.*	*Platelets*	*Colour Index*	*R.B.C. Diam.*	*Temp.*	*Weight*	*Remarks*
Nov. 14	0.9	5,600	22	88,000	1.2	9.9	100	133	Test meal 0/16.
" 20									Vermifuge
" 30	2.0	5,900	58		1.3		100	128	
Dec. 9	2.9		64		1.0				
" 18	3.0	9,900	72	334,000	1.2	8.5	98	130	
Jan. 31	5.0	5,000	85	285,000	0.8	7.8	98	150	Clinically well. Polym. 68 per cent; lympho. 30 per cent.
Feb. 16									Test meal 0/46. No ova in stool.

ent case and one other, suffered from anæmia. The second case, also in a Finlander, showed an identical type of anæmia and achlorhydria. In Finland, where it is estimated that there are about 750,000 cases of diphyllobothrium infestation, only one in from five to ten thousand of the carriers is anæmic. The incidence of anæmia in the disease is therefore not high in Finland, though in a small series of cases in the United States it was estimated that about half of the infested persons develop a hyperchromic type of anæmia. It is said that 84 per cent of cases have no free hydrochloric acid in the gastric contents, while in the others it is well below the normal figure.

As a result of the lack of anæmia in a large proportion of cases, and because the anæmia, when it does occur, is identical with pernicious anæmia, it has been suggested that the cases which develop anæmia are really instances of true Addison's anæmia. The tapeworm infestation is but the added burden on the hæmatopoietic system which precipitates the disease at an earlier age than it would otherwise have manifested itself. This view is supported by Birkeland, who has made the most complete recent study of the disease. He has been able to collect 17 cases in which recovery from diphyllobothrium anæmia after removal of the parasite took place, but which subsequently (after many years) developed a true pernicious anæmia.

The prompt recovery of the case just reported after expulsion of the parasite, without recourse to liver or other similarly acting substances, and especially the prompt return of free hydrochloric acid to the gastric secretion, would seem to be ample evidence that the anæmia in this case at least was not true pernicious anæmia but was associated in some way with the parasitic infestation.

A CASE OF KIENBOCH'S DISEASE

BY W. J. PATTERSON, M.D., C.M., F.A.C.S.,

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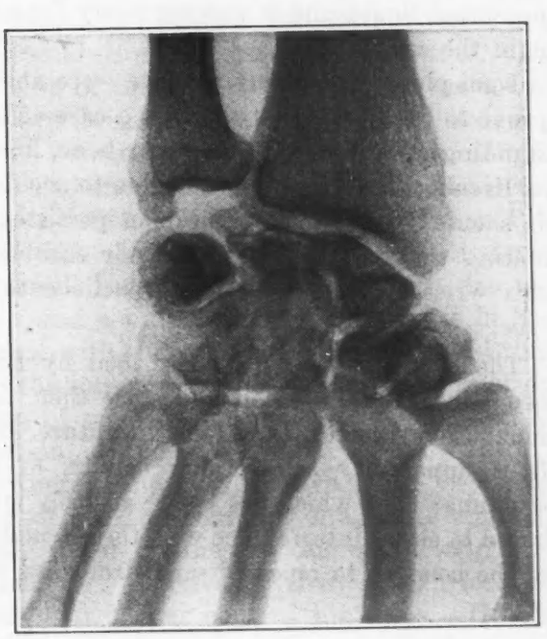
The condition known as Kienboch's disease is one of considerable rarity, but, owing to its importance from a standpoint of diagnosis, and also from its important relation to the Workmen's Compensation Act, it is one which I feel justified in bringing to your attention. Perhaps I can do so best by citing a case which recently came under my notice.

A labourer was engaged by a local firm, and had been working only three hours when he reported an accident. He said that while assisting a fellow workman to lift some planks on to a trestle his partner dropped his end of the plank, causing it to fall and twist his wrist. He continued work for the rest of the day, but said his wrist was painful and that he could not work any longer. This was on April 23, 1930.

He was sent to me the next day. At that time his wrist was slightly swollen, movements were impaired and painful, and there was a small superficial clean wound on the palmar surface of hand, which the patient said had been caused by striking on a nail in the plank at the time of the accident. There was tenderness over the semilunar bone of the wrist, but nothing else abnormal was noted at the time. The patient denied all history of any previous injury or disease of the wrist. He was a young man of good physique, and apparently in the best of health. There was no history of venereal disease.

From the comparatively minor nature of the trauma sustained, and the slight physical signs I could not feel that any fracture, or disloca-



FIGURE

tion, or gross injury to the bones of the wrist joint had occurred, and therefore diagnosed the case as a sprain of the wrist, and treated it by strapping.

I saw the man again on April 28th, five days after the accident, and noted the same findings. The wrist was still painful and tender; the swelling slight, but still present; the small puncture wound, clean and healed; no evidence whatsoever of any acute inflammatory condition; but the man still complained of pain. An x-ray of the wrist was taken that day and again two days later. These showed a destructive lesion of the semilunar bone of the wrist, together with an old fracture. The other bones of the carpus appeared normal.

I then placed the man's wrist in an anterior plaster splint, and wrote his employers that the disability was not due to the accident but to disease which had been present for some time prior to his engagement by them. However, owing to an oversight on the part of the office staff, the man continued to receive compensation, and reported to me at intervals until July 12, 1930. At that time another x-ray was taken, which showed a picture so similar to the one taken three months previously that the two plates could be actually stereoscoped. Again I wrote his employers that this was a case of disease and not accident, and they then stopped paying compensation. The man immediately went before the Workmen's Compensation Board and it was necessary for us to fight the case.

I am pleased to report that we were able to prove to the Board that this was a case of long standing disease of the semilunar bone, known as Kienboch's disease, and not due to accident. It should be noted that the man persisted in stating that he had not had prior trouble in this wrist, but this we do not believe to be true.

The condition was first described by Kienboch[1] in 1910, and I can find since then, only four other references in the literature.[2, 3, 4, 5] It is apparently a rarefying osteitis of the semilunar bone which has been variously attributed to either interference with the circulation of the bone, or to repeated small traumata. In either case the condition results in partial necrosis of the bone, fragmentation, and later fracture.

The symptoms are pain in the region of the semilunar bone, sometimes felt while at rest, but more often in motion. There is tenderness over the semilunar, and there is slight to moderate swelling of the wrist.

The signs which may help in the diagnosis are, first, that the head of the third metacarpal bone is on the same level as that of the second and fourth metacarpals, whereas normally it is more prominent. This alteration is due, of course, to the destruction of the semilunar, which allows the metacarpal to be displaced upwards slightly toward the wrist joint. Secondly, pain may be elicited over the semilunar if one taps the head of the third metacarpal with the fist closed and the hand held in ulnar deflection. As regards function it is usually noted that pronation and supination are good, whereas flexion and extension are limited. Pushing with the hand is impaired and power at the wrist is also lessened. The diagnosis is made chiefly on the very characteristic picture shown in the x-ray, and it should be noted that this picture remains unchanged over long periods of time, and that other bones in the carpus do not seem to be affected. The chief differential diagnosis is from sprains or chronic arthritis of the wrist.

The prognosis is not good. The course of the disease is very slow, and is subject to periods of remission and exacerbation. These latter periods are sometimes the result of minute traumata which would not at all affect a normal wrist.

Nothing very beneficial as regards cure is known in the way of treatment. Rest and splinting have been advised, also the removal of the semilunar. In either case a normal wrist can hardly be expected as a permanent result. At the same time the disability may be very slight over a period of years.

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2. SPEED, Fractures and Dislocations, Lea & Febiger, Philadelphia, 1928, p. 515.
3. ROBERTS AND KELLY, Treatment of Fractures and Dislocations, Lippincott, Philadelphia, 2nd. edit., 1921, p. 465
4. GOLDSMITH, *Ann. Surg.*, 1925, 81: 857.
5. HENDERSON, *J. Bone & Joint Surg.*, 1926, 8: 504.

Editorial

SEPTIC SORE THROAT

STREPTOCOCCAL angina, commonly called septic sore throat, has been known for the last forty years. Despite much study, there are still some problems connected with it that are not yet solved. These are mainly in connection with the organism that is the cause. Some recent work has helped to clarify the situation, however[1].

The disease is an important one, not only because of the serious complications that are apt to attend it but because it commonly assumes an epidemic form and the death rate is high. Intense congestion and œdema of the throat, with or without exudation, are the primary features, together with acute cervical lymphadenitis. The joints are frequently affected, and the heart and kidneys may also be damaged. Pneumonia is a frequent complication and in some epidemics, peritonitis. The tendency, clearly, is for what is at first a local infection to become speedily a general one. The microorganism at work, as might be expected, is a streptococcus, but whether it is specific for the disease, or merely one of a number of closely allied forms, is not quite clear. Ever since Fehleisen isolated a streptococcus from cases of erysipelas, and Rosenbach, from wounds, the group of chain-cocci has been the object of intensive study, but, it must be admitted, without entirely satisfactory results. We know that the streptococcus is, perhaps, the most ubiquitous of microorganisms, that it tends to pick out particular organs and localities, that it tends to invade the general system, that it is commonly very deadly, that, curiously, on the other hand, it may be quite harmless. We still do not know how far the streptococci found in angina, scarlet fever, puerperal fever, erysipelas, and infectious mastitis of bovines are to be regarded as specific; or whether they are merely variants of the same organism, conditioned as to their effects by the local environment in which they find themselves. Attempts to differentiate them into species or sub-species, on the basis of morphology, hæmolysis, reactions to various sugars, agglutination, and agglutinin absorption, have only been partially successful. More helpful have been virulence tests. When, however, we come to epidemiological considerations we are on surer ground.

During the earlier years of this century numerous epidemics of septic sore throat, of severe and unusual type, appeared in various countries. In Colchester, England, 600 persons were attacked in 1905; in Christiania, Norway some 550; in Boston, U.S.A., 1,400 in 1911; in Baltimore, 1,000 in 1912; in Chicago approximately 10,000 in 1911-1912; in Concord, N.H., 1,000 in 1912. It is, perhaps, remarkable that since 1910 no serious outbreak has occurred in England until the Hove epidemic of last year. In the United States there have been many outbreaks during this period.

Septic sore throat may be disseminated through contact[2], but much more often is due to the use of infected milk. Thus, in the Colchester epidemic 96.6 per cent of the cases were traceable to the milk of one distributor, who received his milk from five sources. On one of the farms was a cow suffering from streptococcal mastitis. Exclusion of this animal's milk from the town's supply brought the outbreak to an end. C. L. Scamman (quoted in *Brit. M. J., loc. cit.*) mentions forty-five milk-borne epidemics of streptococcal angina between 1908 and 1928; 55 per cent of these were attributed to a milk handler and 30 per cent to a diseased cow and a milk handler. All this is in harmony with the general testimony, and brings up the important question as to the relationship of mastitis in cattle to the anginal infection of man.

There appear to be two types of bovine mastitis. The common one, acute epidemic mastitis of bovines, is due to *S. mastitidis*, which W. G. Savage (*Brit. M. J., loc. cit.*) found in 68 per cent of his cases. He also

1. *Brit. M. J.*, 1931, 1: 755.

2. WINSLOW AND HUBBARD, *Month. Bull. N. Y. State Dep. of Health*, Sept., 1915.

discovered this strain in quarters clinically sound in 84 per cent, these quarters being rarely involved subsequently, and the naked-eye appearance of the milk being unaltered. The microorganism recovered from such cases is non-pathogenic for mice and of low virulence for laboratory animals generally, though, when introduced into the udders of goats through the teat canal, without injuring the mucosa, mastitis was set up. It is also non-pathogenic for man. Dr. Savage, on two occasions, swabbed his own throat with massive doses of this streptococcus, isolated from a recent case of bovine mastitis, and suffered no ill effects. Moreover, the microorganism was difficult to recover from the throat, showing that the human throat was an alien habitat. As far back as 1912, D. J. Davis[3], in the case of the Chicago outbreak, emphasized the point that the hæmolytic streptococci recovered differed from the type associated with the ordinary bovine mastitis. Mr. F. C. Minett (*Brit. M. J., loc. cit.*) pointed out three characteristics of the streptococci found ordinarily in bovine mastitis, which distinguished them from streptococci of human derivation. First, they were devoid of pathogenicity for the ordinary laboratory animals and also for man. Secondly, when grown in lactose broth for five days, much acid was produced, so that the pH came to rest at from 4.4 to 4.8. Thirdly, the streptococci were able to hydrolyse sodium hippurate to glycol and benzoic acid. He had, however, been in touch with 13 cases of mastitis in which the secretion from the udders had yielded streptococci of quite a different type. In 9 of these the organism in question seemed to be the cause of the mastitis. A test of the pathogenicity of the strain proved that it was competent to set up an acute mastitis. Furthermore, it was pathogenic for mice and rabbits, and produced large amounts of hæmolysin. No conclusion seemed possible but that in these cases the cows' udders were infected from a human source. As further evidence may be adduced the fact that Davis found that streptococci of human derivation could induce mastitis in a healthy cow, and this unaccompanied by "caking" of the bag. Such a form of mastitis might easily escape detection in the routine examination of a herd.

While it is possible, of course, that the milk after drawing may be contaminated with streptococci from a human source, yet it seems probable that in most cases where cattle are incriminated the trouble is due to this special form of mastitis. That outbreaks of streptococcal angina are not more common is due in part to the fact that this type of mastitis is uncommon, as compared with the ordinary epidemic mastitis of bovines; in part, to the fact that streptococci of human derivation may, on occasion, lose their virulence, wholly or partially; but, more definitely, owing to the increasing employment of pasteurization. A.G.N.

3. DAVIS, *J. Amer. M. Assoc.*, 1912, **58**: 1852.

MORE ABOUT B C G

ON several occasions in the past we have dealt with the subject of B C G editorially, and have drawn attention to the sharp cleavage of opinion that exists between Calmette and his adherents in the continent of Europe and the English-speaking authorities in Great Britain, Canada, and the United States, in regard to the propriety of using a living vaccine, B C G to wit, in the attempt to immunize human beings against tuberculosis. The members of the latter group, for the most part, while admitting that Calmette's vaccine is composed of bacilli of greatly restricted virulence, and that its use has not been attended by obvious ill effects so far as the available information goes, yet are not prepared to accept the statement that B C G is a "virus fixe". They feel that there is strong experimental proof that the virus is not fixed; that the virulence of the B C G strain can be augmented by certain changes in the culture media on which it is grown; that we have little or no precise information as to what happens, or may happen, when the living germ of tuberculosis is administered to human beings. Consequently, they hold that the use of B C G for the preventive inoculation of human beings is not justifiable.

That the virulence of the strain of tubercle

bacilli which composes B C G can be enhanced on occasion has been shown by not a few workers, notably Petroff, Dreyer and Vollum, E. A. Watson, Uhlenhuth and Seiffert, to mention only some. The latest work, that of Sasano and Medlar*, still further strengthens this contention.

Sasano and Medlar express the fear that Calmette's dictum in regard to a "virus fixe" may lead some workers to conclude that it makes very little difference under what conditions the organism is grown. They show that this is not so, for, from their experiments, they conclude that the cultural environment has a profound influence upon the virulence of B C G. However, they remark that the factors necessary to produce the proper environment are largely unknown. Temperature and the pH are important, indeed essential, factors, and the addition to the culture medium of unheated normal rabbit serum is favourable to the rapid development of virulence. Sasano and Medlar have found Sauton's medium to be rather unstable, and for this reason titrate it to a pH of between 7.2 and 7.4 just before the addition of the rabbit serum and the inoculation with the bacilli. Using this technique, they have succeeded in establishing that B C G attained a virulence greater than that of any other culture of *B. tuberculosis* that they had in their laboratory. When transferred to Petroff's egg medium the virulence was retained for six months, although somewhat diminished. A fact of great importance is that their altered culture became equally pathogenic for guinea pigs, rabbits and cattle. Furthermore, the work of Sasano and Medlar substantiates that of Petroff on the "dissociation" of B C G. They did not use Petroff's method, but their end-results were similar. There can be no question but that the gross appearance of virulent and non-virulent cultures is different. The virulent cultures are colourless, smooth and veil-like, and are easily emulsified; the cultures of low virulence are often coloured, rough, compact, and emulsified with difficulty. Sasano and Medlar brush aside any possibility of contamination of their cultures and add that they do not hesitate to discard completely the charge of contamination brought against Petroff's researches. The selection of the proper medium to maintain the growth of B C G at a constant point of innocuousness is a matter of prime importance. Since we know so little concerning the factors that augment or diminish the pathogenicity of the tubercle bacillus, and since it is possible, *in vitro*, to bring about such marked alterations in character of the organism constituting B C G, caution is very necessary in using Calmette's vaccine as a prophylactic for tuberculosis. It is obvious that when B C G, a living virus, is introduced into the animal body all control of the bacillus and its activities is done away with. What happens then is in the lap of the gods. Sasano and Medlar conclude, as a result of their investigations, that B C G is not a "virus fixe", and that its stability depends entirely on its environment.

A.G.N.

* SASANO, K. T., AND MEDLAR, E. M., *Am. Rev. Tuber.*, 1931, **23**: 215.

Editorial Comments

Apical Infection of the Teeth

Dentists and medical men are familiar with the appearance in skiagrams of small areas of rarefaction that are often to be found at the apices of the teeth. Rather curiously, considering what they have proved to be, teeth so affected are not painful, and, in fact, may not be under particular suspicion. When such teeth are extracted a small gelatinous "drop" is found at the apex, variously designated as a "granuloma" or "abscess". By dentists, at least, these granulomata have been widely accepted as a manifestation of infection, but the evidence in favour of this etiology has not been entirely convincing. Yet the point is of considerable practical importance. If the granuloma represents a focus of infection then drainage is not external, as is the case in pyorrhœa, but internal, into the blood stream; this would afford a *point d'appui* for those who believe that focal infection about the teeth explains many of our acute and chronic ailments, rheumatoid arthritis, to wit. On the other hand, if the granuloma is not infective in nature, teeth so affected might very well be left alone. Weston Price, indeed, has suggested that the granuloma represents a defensive barrier against infection

and so may be regarded as a friend rather than an enemy. The solution of the problem has, then, an important bearing on dental practice—on filling and extraction.

Arthur Bulleid, in four recent papers in the *British Dental Journal* (1931, Jan. 16 *et seq.*), has made an important advance in the elucidation of this question. Mr. Bulleid examined eighty teeth which showed granulomata radiologically and were extracted. Taking great care in his technique to avoid extraneous contamination, he made cultures from the granulomata, both ærobically and anærobically. It is important that anærobic methods should be employed, for in eight cases granulomata which gave no growth ærobically gave one under anærobic conditions. From all the eighty cases streptococci were isolated, usually alone, but sometimes with other organisms. This observer also brings out the interesting fact that granulomata are relatively common in pulpless teeth that have had their root canals filled. Is there cause and effect here? Further work is needed, but a definite contribution to our knowledge has been made. A.G.N.

Sir Byrom Bramwell, M.D., LL.D., D.C.L., F.R.C.P. (Edin. and Lond.), F.R.S. Edin.

The death of Sir Byrom Bramwell at Edinburgh, on April 27th, in his eighty-fourth year has removed a distinguished figure from the ranks of the medical profession. Though better known to the students and practitioners of a generation ago, his name has been a living force even up to now.

Born at North Shields, he inherited the medical tradition, for both his father and his grandfather were doctors. After a distinguished undergraduate career, during which he took no less than seven class medals, he graduated M.B., with Honours, at Edinburgh in 1869, returning to practise at his birthplace with his father. In 1871 he was appointed Lecturer on Medical Jurisprudence and on Pathology at the University of Durham School of Medicine at Newcastle, and in 1874 was appointed physician and pathologist to the Royal Infirmary in that city. In 1877, he obtained his M.D. degree, with a thesis entitled "Reports on Clinical Cases", which procured for him a gold medal. Fired with the idea of becoming a teacher of clinical medicine and a consultant, Bramwell removed to Edinburgh in 1879. At once he evidenced the originality of his mind, for he instituted an extra-academical course on medical diagnosis, which speedily became popular, and his example was followed by other teachers. For three years he acted as pathologist at the Royal Infirmary; became assistant physician in 1885, and full physician in 1897. On the death of Sir Thomas Grainger Stewart, by which the Chair of Medicine in Edinburgh University became vacant, Bramwell became a candidate, but despite his eminent qualifications, to the regret of his friends and students and himself he was not elected. Nevertheless, he still carried on with his accustomed ability and zeal. His personality and great talents attracted his colleagues in the profession and he obtained a very large consulting practice.

As a teacher Bramwell was incisive, often dogmatic, but drawing on a great wealth of experience, and his clinics were always crowded. He was a man of keen insight, systematic and painstaking in his clinical examinations, and soon gained the reputation of being accurate and helpful in his diagnosis, treatment and prognosis. Though primarily a neurologist, he touched general medicine at many points. During thirty years he produced one hundred and sixty medical papers, many of them of the first importance. Only a few of his works can be noticed here. Chief among them are his book on "Diseases of the Spinal Cord"; "Diseases of the Heart and Aorta"; "Intracranial Tumours" (1888), which is still a classic; "An Atlas of Clinical Medicine"; and "Lectures on Aphasia."

Among the many contributions to medical knowledge made by Byrom Bramwell some are of notable importance. He was the first to use arsenic in the treatment of pernicious anæmia; in 1872 he called attention to the transmission of scarlet fever through the milk supply; in 1893 he first introduced the treatment of psoriasis and other skin diseases with thyroid extract; in 1902 he first described a condition of infantilism due to pancreatic defect.

Honours came to Bramwell late, but, when they did, they came fast and furious. He had many honorary degrees and was a member of many British and foreign learned societies. He was knighted in 1924.

Sir Byrom Bramwell ranks among the most distinguished of clinicians and sheds much lustre on the medical science of his time.

A.G.N.

Aldred Scott Warthin, M.A., Ph.D., M.D., LL.D. (Hon.)

The sudden death, on May 23rd, last, in his 64th year, of Dr. Aldred Scott Warthin, Professor of Pathology and Director of the Pathological Laboratories at the University of Michigan, Ann Arbor, Mich., has come as a great shock to his many friends on both sides of the Atlantic and to the profession at large. Cut off by coronary thrombosis in the full flood of his activities, his death is an inestimable loss to the medical profession on this continent, among whom for the past thirty years he has filled an increasingly important place, both as

an investigator of the first rank, an able organizer and a really great teacher, whose fundamental methods and enthusiasm for exact knowledge gave the sure foundations of a sound training in pathology to many of the leaders in American Medicine to-day. No better evidence of this latter point could be adduced than the splendid Anniversary Volume[1] presented to him on his sixtieth birthday, containing original scientific contributions from some sixty of his former pupils, practically all of whom have attained high professorial status.

A fine evaluation of his work as an investigator is given by his Associate Professor Carl V. Weller, in a preface to his bibliography in the above mentioned volume. His laboratory in the early days of the Ann Arbor Medical School, was, in the words of Sir William Osler, "a little field well tilled" and it has blossomed to-day into a mighty harvest. Based on the patient and systematic study of each individual autopsy at that period in the nineties of a relatively limited material, there resulted a wealth of original observations that culminated in many outstanding contributions, such as the nature and function of the hæmolymph nodes, the histopathology of certain obscure forms of neoplasm, Ayerza's disease, and other infections, the genetic relations of the leukæmias and allied states to other lymphoblastomata and in the "New Pathology" of visceral syphilis, congenital and acquired. The great ovation which he received from the British Medical Association at its Manchester meeting on the occasion of his address on the latter subject some two years ago will always live in the writer's memory, as also grateful reminiscences of his vision and public-spirited cooperation in the organization and early publications of the International Association of Medical Museums.

Dr. Warthin was born at Greenburg, Ind., and obtained his B.A. degree from Indiana University, and M.A., Ph.D., and M.D. degrees (the latter in 1891) from the University of Michigan, where he subsequently served in the Department of Internal Medicine under Dr. George Dock (1892-95) and then on the Teaching Staff of its pathological department. He was appointed to the Chair of Pathology in 1903 and in 1928 he received the degree of LL.D. from the University of Indiana (*hon. causa*). He has held the highest offices in the gift of the American Profession, serving at various times as President of the American Association of Pathologists and Bacteriologists, of the American Society for Cancer Research, of the American Association of Physicians, of the International Association of Medical Museums and of its American and Canadian Section, President of the Association of Experimental Pathology and of the American Section of the International Medical Historical Society, and from the year 1923 he has been a member of the Board of Regents and Vice-President of the American College of Physicians, and editor of its official organ the *Annals of Internal Medicine*. He was also a member of the British Pathological Society and many other Societies.

M. E. ABBOTT

From Dr. Warthin's close friend and associate of many years' standing, the present Dean of the Medical Faculty at McGill, comes the following tribute:—

In his professional association Dr. Warthin occupied a unique place. Using the terms in their most approved sense, he was a purist in his attitude to life and an idealist in matters of personal ethics; a man to whom, as to Juvenal, nothing human was foreign, and whose conduct was marked by a breadth and catholicity, even as were his tastes. Of him it could be truly said that his moral graces were every whit as exceptional as his intellectual attainments.

Unswerving in his devotion to his professional career, and above all to the ideals of "white-mindedness" and scientific exactitude, he drained his life's blood to the dregs. No man's life was ever more completely rounded than his; no one enjoyed more an avocation in the fine arts of painting, music and literature; few could appreciate as did he the essential and permanent values of these auxiliary studies and pleasures. Apart from his scientific achievements he was pre-eminently an authority on these subjects, having written with singular sympathy and insight on the Wagnerian tetralogy and on the Great Masters of the Venetian School, notably Titian.

As an exponent of medical history he made memorable contributions to its annals, and in his "*Dance of Death*"[2] he has left us a classic, certain to be read with interest and profit by every student of medicine to whom this last product of his pen becomes known.

C. F. MARTIN

1. Contributions to Medical Science dedicated to Aldred Scott Warthin. Edited by Willard J. Stone and Carl Vernon Weller, Ann Arbor, 1927.

2. The Physician of the Dance of Death. By Aldred Scott Warthin, Ph.D., M.D., LL.D. *Annals of Medical History*, 1930, N.S. **2**: 351, 453, 697.

Hospital Service Department Notes

SUGGESTIONS FOR STAFF RULES AND REGULATIONS

APPLICABLE TO A SMALL HOSPITAL, WITH A LIMITED STAFF, THE MEMBERS OF WHICH CONDUCT GENERAL PRACTICES

In response to many requests from hospitals in various parts of Canada, the Department of Hospital Service of the Canadian Medical Association has formulated the following staff rules and regulations, the sections being compiled with suitable modifications and revisions from various sources.

The rules and regulations suggested here are general in nature and designed to serve as a guide only to constitution committees, as it may be necessary to alter some of the sections to suit individual requirements. Explanatory notes are interpolated and should be deleted from the draft adopted by hospital staffs and submitted to Boards of Governors for ratification. While these regulations are designed primarily for small hospitals they can be modified to suit larger institutions. Reprint copies of "Suggestions for Staff Rules and Regulations" may be obtained from the Secretary of the Department of Hospital Service, Toronto.

Section 1.—For the purpose of these By-Laws, the term "Staff" shall include all physicians who have been granted the privilege of practising in the ..... Hospital by the Board of Trustees and who have signified their willingness to abide by the rules and regulations governing the Staff of the Hospital by signing an agreement thereto.

Section 2. — (a) All practitioners treating patients in this Hospital shall be governed by these By-Laws, and by such rules and regulations consistent herewith as may be enacted from time to time by the Medical Staff and by, or under, the authority of, and with the approval of, the Board of Trustees.

(b) Every practitioner entitled to the privileges of this Hospital must be duly registered to practise in the Province of .....

Section 3.—Every practitioner in the Hospital will be required to maintain a high standard of professional service to the patients under his care, to make adequate use of all available diagnostic facilities, to keep full and complete case records in the manner prescribed by the superintendent or approved by the Board of Trustees, to comply with all standardized procedures and technique adopted by the Staff Executive Committee, to conform to the established consultation policy of the Hospital, and to discharge his patients from the Hospital as early as their condition permits.

Section 4.—(Optional)—The Staff shall be divided as follows:—

Consulting Staff.
Active Staff.
Associate Staff.

(In some hospitals, it is considered advisable to have the doctors practising in the town where the Hospital is located, designated as the "Active Staff" and the doctors contributing to the Hospital and living in neighbouring villages or towns considered as members of the "Associate Staff." Senior members of high professional standing who are not actively engaging in practice, or who wish to be relieved of ward responsibilities, and consultants from neighbouring centres, may be made members of the "Consulting Staff". Members of the Consulting Staff and Associate Staffs are frequently given privileges similar to those of the Active Staff, with the exception that they do not take charge of non-pay patients.)

Section 5.—Physicians, Surgeons and Dentists not on the Medical Staff desiring the privilege to practise in the Hospital may be given permission temporarily by the Superintendent, after consultation with the President of the Staff, until membership upon the Medical Staff according to the regulations as herein provided is granted. The facts relative to the above named temporary privileges shall be placed before the Board of Governors at the next regular meeting.

Section 6.—Appointment to the Staff shall be yearly and shall normally be made at the annual meeting of the Staff in the month of ....., or as soon thereafter as possible, and shall continue for one year subsequent to the date of appointment.

Section 7.—The Medical Staff shall be organized and shall appoint, at the annual meeting, a president, a secretary-treasurer, such committees as may be desirable, and a representative to the Board of Governors of the Hospital, if that be permissable. Appointment or election to office shall be annual. For the transactions of business, 50 per cent of the members of the Active Staff shall constitute a quorum and at least forty-eight hours' notice by letter or telephone shall be considered sufficient for an ordinary meeting. If meetings be held at which amendments to the constitution are to be considered, seven days' notice in writing must be given to each member to render such proposed amendments valid.

(Even though the Staff be limited to three or four members, it is highly desirable to have some organization. This permits crystallization of the medical viewpoint, facilitates conferences and transactions with the Board of Governors, simplifies hospital procedures and routine, and is in the best interests of the Hospital, the patient and the profession. The chairman of the Staff need not necessarily be the outstanding man of the staff nor the man who sends in the most patients. This office should be given in turn to the senior medical men and the incumbent should not use his position in public for personal gain.)

Section 8.—It shall be the duty of the Active Staff to draw up rules and regulations or amendments thereto, subject to Section 7, governing the

professional work of the Hospital, and submit the same to the Board of Governors for approval. On approval by the Board of Governors, such rules and regulations or amendments thereto shall at once come into operation.

Section 9.—(a) The attending physicians shall be held responsible for a complete record of the patient in the Hospital files. This record shall include the family history, past history of the patient, the history of the present illness, a complete physical examination, laboratory findings, progress notes, the treatment both medical and surgical, the condition on discharge, the final diagnosis, and in case of death, the autopsy findings when available. He shall also record an order for the discharge of the patient or in case of death he shall make record of the cause of death.

(b) The Surgeon shall be held responsible for a complete description of the technique of operative procedure and the findings in all such cases, whether minor or major. This report shall be written up immediately at the conclusion of the operation.

(c) Progress notes, sufficient to adequately cover all changes of condition in the patient, should be duly entered on the record by the attending doctor. All orders by the attending doctor shall be in writing, and when transmitted over the telephone shall be given only to the interne or a supervising nurse, who shall immediately record it in the usual way, to be initialed later by the attending doctor.

Section 10.—Patients for major operations must be in the Hospital not later than 4 p.m. of the day preceding the operation, excepting those who are admitted for emergency operations. Minor cases not requiring an anæsthetic should be in the Hospital at least one hour before operation.

Section 11.—All tissue removed at operation must be considered as the property of the Hospital and available to the Medical Staff for pathological report if so desired.

(Larger hospitals insist upon all tissue removed at Hospital being examined by the pathologist. This is not possible in smaller hospitals and to send every specimen away to distant laboratories entails additional expense to the patient. It is necessary, however, to protect the patient and the good name of the Hospital and the other surgeons from the actions of a few unscrupulous or careless members of the profession. This rule would permit the ethical members of the medical profession to protect the public and their own reputations from such an operator.)

Section 12.—Any case for therapeutic abortion must be seen by one member of the Staff in addition to the attending doctor and the former's affirmative opinion as to the necessity for emptying the uterus, with statement of indications, must be recorded on the chart before any such procedure is undertaken.

Section 13.—In any case of evident or suspected criminal abortion, complete, or incomplete, induced by patient or any other individual, a properly witnessed statement must be secured, if possible, from the patient and from her husband, relative, or other responsible person having knowledge of the circumstances. Such statement should indicate that the abortion was induced, the manner of induction, and should specifically state that this condition took place before admission of the patient to the Hospital, and before she consulted her present medical attendant. The case must also be seen by at least one member of the Staff besides the attending physician, whose affirmative opinion must be recorded upon the chart before any surgical procedure for emptying the uterus is carried out.

Section 14.—No curettage shall be done under any circumstances without previous consultation with a member of the Staff or a recognized consultant.

Section 15.—(a) Members of the Medical Staff are expected to give such information as will enable the hospital administration to protect the other patients from those who are suffering from contagious diseases or other conditions which might be detrimental to the physical welfare of the other patients in the same ward.

(b) No maniacal, delirious or irresponsible patient shall be admitted without the consent of the superintendent.

Section 16.—Whenever the welfare of any patient in the Hospital or the best interests of the Hospital, in the judgment of the Superintendent or of the Executive Committee of the Medical Staff, demands a consultation, acquiescence to such request shall be expected of the attending physician or surgeon, and, in such case, the latter may select the consultant from the senior members of the Medical Staff of the Hospital. When such consultation is advised by the Hospital, no fee shall be charged by any member of the attending or consulting staff unless such is expressly requested by the attending physician.

Section 17.—Unprofessional and unethical conduct and violation of the staff rules or other by-laws of the Hospital by any member of the Staff shall deprive such member of the privileges of the Hospital. Any member against whom the foregoing charges have been preferred shall be notified of such charges, and shall have the opportunity of appearing before the Executive Committee (or the Ethics Committee, if one exists) in his own defense before final action upon the charges shall be taken by the Board of Governors. No doctor shall be dismissed without just cause.

(Comment: Such matters should be handled by the medical men themselves if at all possible. Publicity is most undesirable.)

Section 18.—The care of indigent patients in the Hospital shall be arranged by the members

of the Active Staff. A schedule of rotation of service or allocation of work shall be drawn up and endorsed by the Active Staff. Consultation on indigent patients shall be between members of the Active Staff among whom such care rotates. Operative cases coming under the care of a physician must first be referred to a surgeon on the Active Staff and shall be referred to an outside consultant only with the acquiescence of a local surgeon first consulted or if, in the judgment of the physician in charge, the case is one in which special skill, not available locally, is required. No fee shall be charged for the care of a patient occupying a free bed. It will be understood that the superintendent will endeavour to lighten these charitable duties as far as the interests of the patients will permit.

Section 19.—Unified Routine Orders shall be arranged whenever possible by the Staff to facilitate the work of the Hospital.

Section 20.—(If a Hospital dispensary is maintained) Doctors are requested to confine their prescriptions as much as possible to the B.P. or C.F. approved preparations. The frequent use of high priced proprietary drugs causes considerable wastage and increased expense to the Hospital and to the patient.

Section 21.—No regulations affecting the Staff shall be put into operation by the Board of Trustees without giving the Medical Staff an opportunity to discuss them and present their viewpoint. Plans for extensions or alterations to the Hospital shall be submitted to a committee of the Medical Staff for suggestions before being finally approved.

Section 22.—(Suggestion)—Any rules, regulations or by-laws passed by the Board of Trustees which appertain to the Medical Staff shall be first reviewed by the hospital solicitor.

Section 23.—These by-laws shall come into effect when passed by the Medical Staff and when approved by the superintendent and the Board of Trustees.

(Hospital problems may be referred to the Department of Hospital Service of the Canadian Medical Association which is in close touch with hospital customs and procedures throughout Canada. Address communications to 184 College Street, Toronto.)

THE DOMINION CENSUS AND HOSPITAL DATA

It has been a matter of regret that information concerning hospital development has been very incomplete and the data that have been assembled by our Department of Hospital Service and other organizations have omitted so much that their value for certain statistical studies has been very much weakened. Now, in connection with the decennial Dominion census, the Bureau of Statistics proposes to make a very thorough study of hospital activities in Canada, and to compile hospital statistics which should be of unusual value to all interested in health work, sociology or economics. The study will not be one of statistical interest only but will embody many features upon which requests for information are frequently received by our Hospital Department. The Dominion Statistician has very kindly included in this questionnaire a number of enquiries concerning services, facilities provided, organization, etc., of considerable interest and value to us and the data received and compiled will be available for our consultation service to hospitals. As this is a survey of the utmost importance it is hoped that all hospitals will cooperate fully in the collection of this information.

Provincial Association Notes

THE FIFTY-FIRST ANNUAL MEETING OF THE ONTARIO MEDICAL ASSOCIATION

Kindly skies, a radiant sun, exhilarating air, and the beautiful setting of Niagara Falls provided a magnificent background for the fifty-first annual meeting of the Ontario Medical Association, held on May 26th, 27th, 28th and 29th, inclusive, 1931.

The first day was given over to business, with sixty-one delegates present from the affiliated Societies, this number being augmented by forty additional members at the Round Table Dinner and discussion which took place that evening.

On the following three days, a scientific program of a very high order was presented.

During the business sessions, reports were presented from the Directors, the Counsellors and the various standing committees. The following data will be of particular interest:—

District Meetings

During the past three years the average attendance at the District Meetings held throughout the province was 1,050.

Post-Graduate Meetings

One hundred and seventy-five speakers addressed meetings in 35 affiliated medical societies during the year. The post-graduate schedule is being revised and will be issued shortly, this being the fiftieth edition of same.

The Ontario Radiological Society

The Ontario Radiological Society has handed back its charter to the Ontario Medical Association, having disbanded to become the Section of Radiology of the Association. The Ontario Medical Association was glad to welcome the Radiologists back in to the fold.

Affiliated Societies

All the Counsellors reported their constituent societies to be active and in a healthy state of organization. Dr. F. C. Neal, Counsellor of District Number Six, presented some illuminating figures with regard to the cost of medical educa-

tion, medical practice and medical income. From the survey carried on in the six counties under his jurisdiction, the following figures were obtained:—

1. Average capital expenditure to get into practice, $18,125.74.
2. Average cost per year to carry on practice, $3,924.96.
3. Gross annual amount charged on books, $6,390.99.
4. Actual annual income, $5,144.24.
5. Amount yearly unable to collect, $1,246.75.
6. Work done yearly for which no charge is made, $814.82.
7. Cost per family of four or five per year for medical care, $45.29.

Regarding items numbers 5 and 6, as there are in this District 190 doctors in active practice, this would mean that absolutely free work done every year in this district alone would amount to above $391,590.00. In the whole of Ontario, it would amount to over $8,044,000.00, estimating that there are 4,000 practitioners in the Province.

Income, as per questionnaire, District Number Six:—

Number receiving $3,000 a year or less	13, or 17½	Per Cent
Number receiving over $3,000 and up to and including $4,000	19, or 27	"
Number receiving over $4,000 and up to and including $5,000	6, or 8	"
Number receiving over $5,000 and up to and including $6,000	14, or 19	"
Number receiving over $6,000 and up to and including $7,000	5, or 7	"
Number receiving over $7,000 and up to and including $8,000	7, or 9½	"
Number receiving over $8,000 and up to and including $9,000	3, or 4	"
Number receiving over $9,000 and up to and including $10,000	3, or 4	"
Number receiving between $10,000 and $12,000, including $12,000	1, or 1⅓	"
Number receiving over $12,000	3, or 4	"

FINANCIAL MATTERS

The report of the Honorary Treasurer was very gratifying to the members, in that it showed liquid assets amounting to $44,119.10, with no liabilities.

BENEFIT FUND

The Benefit Fund was found to be of distinct value to two or three worthy cases during the past year. The Association decided to place the interest on $15,000 of its assets at the disposal of the Benefit Fund Committee for the coming year.

The Association accepted with gratitude and pleasure the offer of the Chairman of the Committee, Dr. John Ferguson, to donate $100.00 towards the Benefit Fund.

ELECTION OF OFFICERS

The officers elected for the ensuing year were as follows:—

President, Dr. L. J. Austin, Kingston; *1st Vice-President*, Dr. J. H. Holbrook, Hamilton; *2nd Vice-President*, Dr. F. C. Neal, Peterborough; *Hon. Treasurer*, Dr. G. Stewart Cameron, Peterborough; *Secretary*, Dr. T. C. Routley, Toronto.

Counsellors:—District No. 1, Dr. Geo. A. Ramsay, London; No. 2, Dr. A. J. McGanity, Kitchener; No. 3, Dr. Richard Howey, Owen Sound; No. 4, Dr. W. K. Colbeck, Welland; No. 5A, Dr. J. C. Cummings, Bond Head; No. 5B, Dr. A. J. Mackenzie, Toronto; No. 6, Dr. Geo. Stobie, Belleville; No. 7, Dr. W. A. Jones, Kingston; No. 8, Dr. W. S. Lyman, Ottawa; No. 9, Dr. A. H. McMurchy, North Bay; No. 10, Dr. J. C. Gillie, Fort William.

LIFE MEMBERSHIP

The Association was glad to extend life membership to the following gentlemen who have long been active in the work of the profession:—Drs. W. M. Mather, Tweed; J. H. Radford, Galt; and Wm. Philp, Hamilton.

THE ROUND TABLE CONFERENCE

The Round Table discussion centred almost entirely on the subject of Health Insurance. For the purpose, an exhaustive report had been prepared by the Committee on Inter-Relations. A large number of the 106 men present took part in the discussion, which was carried on for a period of several hours. At the conclusion of the evening, the meeting, by resolution, instructed that the summary prepared by the Committee be accepted as a progress report, and that it be referred back to the Committee for further study and report again next year.

TARIFF

The Association adopted one or two minor changes in its tariff, in the following items:—

City practice.—Dislocation of the jaw, $15.00 instead of $10.00.

Town and country practice.—1. Health examination with certificate, $5.00 and up instead of $2.00 to $25.00; 2. Removal of foreign body from eye, ear, or nose, $2.00 and up.

UNIVERSITY SCHOLARSHIPS

Of particular interest to the universities, the profession, and the undergraduates in medicine was the announcement that the Association will provide in each of the universities, an annual prize, to be known as the Ontario Medical Association Prize in Preventive Medicine. The modest sum of $25.00 will be awarded to the student in each of the three medical schools of the Province, who takes the highest standing in the subject of preventive medicine in the final year of that course.

DISTRICT MEETINGS

The following dates were tentatively approved for the several District Meetings to be held this coming autumn:—

District No. 1, Friday, October 30th, in London; No. 2, Wednesday, October 7th, in Guelph; No. 3, Thursday, October 8th, in Owen Sound; No. 4, Thursday, October 29th, in Hamilton; No. 5A, Tuesday, October 6th, in Brampton; No. 5B, Tuesday, December 1st, in Toronto; No. 6, Wednesday, September 30th, in Lindsay; No. 7, Friday, November 13th, in Kingston; No. 8, Thursday, October 22nd, in Ottawa; No. 9.

Wednesday August 5th, in Gravenhurst, and Saturday, September 5th, in Sault Ste. Marie; No. 10, Monday, September 7th, in Fort William;

Members are asked to note these dates in order that, in scheduling their activities, they may endeavour to keep themselves free for attendance thereon.

STANDING COMMITTEES

The following gentlemen were appointed Chairmen of the Committees, as scheduled:—

Benefit Fund	Dr. John Ferguson, Toronto;
Editorial Board	Dr. J. H. Elliott, Toronto;
Credentials and Ethics	Dr. H. C. Wales, Toronto;
Education	Dr. Geo. C. Hale, London;
Historical Medicine	Dr. I. E. Crack, Hamilton;
Industrial Medicine	Dr. J. G. Cunningham Toronto;
Inter-Relations	Dr. F. C. Neal, Peterborough;
Legislation	Dr. Harris McPhedran, Toronto;
Mental Hygiene	Dr. G. A. McLarty, Toronto;
Necrology	Dr. J. H. Elliott, Toronto;
Public Health	Dr. W. L. Hutton, Brantford;
Tariff	Dr. Jas. McQueen, Galt;
Workmen's Compensation Board	Dr. M. H. V. Cameron, Toronto.

Representatives of the Ontario Medical Association on the Joint Advisory Committee:—Drs. I. J. Austin, G. Stewart Cameron, A. J. Mackenzie, T. C. Routley.

NOTICE OF MOTION

Dr. W. K. Colbeck, of Welland, has presented the following notice of motion which, in due season, will be brought before the Association for discussion and action:—

"That, where a man and wife are both engaged in the practice of medicine, the membership fee in the Ontario Medical Association for both together shall be one and one-half times the regular membership fee for one person."

NEXT ANNUAL MEETING

The Association decided to meet in Toronto next year. This probably will be a joint meeting with the Canadian Medical Association.

ATTENDANCE

With an attendance of 418 doctors and 149 ladies, the numbers at the meeting were somewhat smaller than usual, but, in view of the prevailing financial depression throughout the country, it may be considered very good.

THANKS

The Association was pleased to express its hearty appreciation to the Niagara Falls Committee, headed by Dr. E. T. Kellam, and the Ladies' Committee, headed by Mrs. Kellam, and all associated with them, for the hearty co-operation they rendered in planning and carrying out the arrangements connected with this meeting. The smoothness and perfect harmony with which the events of the week were carried out were evidence of the careful preparation given to every detail.

A special vote of thanks was tendered the Queen Victoria Park Commission for their kindness in entertaining the visiting doctors and ladies at a garden party at the Glen; and also to Mrs. Harry Oakes who entertained the ladies to a very delightful tea.

In the Scientific Program, 29 speakers gave addresses, all of which were of a very high order and heartily appreciated by those who heard them.

At the luncheon on Wednesday, May 27th, the Honourable Dr. J. M. Robb, Minister of Health for Ontario, gave a very interesting address on matters pertaining to the work of his Department; and at the Thursday luncheon, the Honourable J. R. Cooke, of the Hydro Power Commission for Ontario, gave a delightful talk on "Light and Power."

On Wednesday evening, May 27th, about four hundred members and their wives attended the annual banquet in the Clifton Hotel. The President, Dr. Ward Woolner, in his valedictory address, took as his subject, "Am I My Brother's Keeper". Dr. Lewellys F. Barker, of Baltimore, presented a very interesting picture of types of "Elations and Depressions", much to the amusement and pleasure of the audience. The remainder of the evening was spent in dancing and bridge.

On Thursday evening, an open forum and smoker was held for the men, the chief speaker being Dr. J. G. FitzGerald, of Toronto, who gave a talk on "The Health Activities of the League of Nations". Altogether, the meeting was interesting, pleasurable, and profitable.

PROVINCE OF QUEBEC MEDICAL ASSOCIATION

ANNUAL CLINICAL DAY, SEPTEMBER 10TH, 1931

The Province of Quebec Medical Association will hold its Annual Clinical Day on Thursday, September 10th next, in the City of Quebec. It is to be the only large medical reunion to be held in this Province this year. On the day preceding, the Council will meet, when general business will be attended to.

The Clinical Day will consist of a large meeting similar to the clinical reunions organized by the Post-Graduate Committee throughout the Province during the summer months. The morning will be devoted to clinics in the different hospitals, particularly at St. Sacrament and the Hotel-Dieu for the French-speaking doctors, and in the English hospitals for the English-speaking doctors. At 12.30, lunch will be served at the Chateau Frontenac after which the annual meeting of the Province of Quebec Medical Association will be held, when reports of the Executive Committee, of the Treasurer, and of the different sections will be read, and where elections are to take place. The afternoon will be free for those anxious to indulge in sports: tennis, golf, etc.; on the other hand, laboratories will be opened to those desirous of visiting in small groups. At 7.30 p.m. the annual dinner will take place; ladies will be admitted, and a para-medical causerie will be given by a well known physician.

This program is but preliminary but it is gradually materializing and should be sufficiently inviting to attract a large attendance.

The annual fee of the Association, three dollars, allows for participation in the meeting. All doctors who are not already members of the Association are welcomed to send in their application to the General Secretary, Doctor Léon Gérin-Lajoie, 1414, Drummond Street, Suite 701, Montreal, and to send in their fee of three dollars, which will register them automatically for this annual meeting.

L.G.-L.

Medical Societies

BORDER MEDICAL SOCIETY

The Border Medical Society had an enjoyable meeting at Reston, Manitoba, on May 27th. Twenty-five doctors were present and a dozen ladies. Hon. Dr. E. W. Montgomery and Dr. Neil John MacLean, of Winnipeg, were the principal speakers, and gave stimulating and illuminating addresses on "Maternal Welfare" and "Cancer of the Breast" respectively. Dr. H. O. McDermid of Brandon, President of the Manitoba Medical Association, outlined the work of the Manitoba Medical Association and extended a hearty invitation to the annual meeting at Brandon in September. Dr. Noel R. Rawson, of Melita, was appointed to represent the members of the Manitoba Medical Association in the south-western area of Manitoba. In the evening Dr. Montgomery gave a public address on "The Life Story of Dr. Gordon Bell."

The ladies were received by Mrs. Clarke and Mrs. Chapman. The next meeting will be at Oxbow in July and will be addressed by two physicians from Regina.

EDMONTON ACADEMY OF MEDICINE

The June meeting was held at the Medical Building of the University on June 3rd. As a preliminary Dr. Heber Jamieson resumed his series on the medical history of Western Canada and took up the careers of a number of the early medical pioneers up to the period when the control of law and order came under the famed North West Mounted Police. Dr. Harold Vango followed with an interesting and instructive paper illustrated by lantern slides on "Some phases of Identification in Criminology" dealing largely with finger prints and marking on bullets and discharged shells.

An animated discussion resulted from Dr. Atkinson's re-opening of the subject of "State Medicine" considerations of which had been adjourned from the April meeting. By resolution Dr. N. L. Terwilleger, Treasurer of the Alberta Medical Association, was empowered to appoint a Committee to bring in a report at the meeting of the Alberta Medical Association to be held in September next at Calgary.

On account of the summer vacation, no further meetings will be held till September when a symposium on peptic ulcer will be presented by the staff of the Royal Alexandra Hospital.

MEDICAL SOCIETY OF NOVA SCOTIA

HALIFAX BRANCH

At a clinical meeting held at the Victoria General Hospital on the 25th of February, Dr. Gerald Burns presented a case showing the clinical signs of pernicious anæmia but without the appropriate blood picture, and Dr. Corston showed a case of staphyloccal empyema which had cleared up without drainage. Dr. Carney related the histories of three cases of injuries to the spinal cord, in each of which paralysis developed only after the lapse of some time. In one case, a man had been pulling strongly, lost his grip and sat down forcibly. Symptoms of paralysis did not appear for some weeks and developed slowly. On admission to hospital the symptoms pointed to a lesion high in the cervical region. This was confirmed by the x-ray examination. Dr. Mack presented a case of arsenical dermatitis following four administrations of neo-salvarsan. Dr. K. A. Mackenzie showed cases of paroxysmal tachycardia, multiple hydrarthrosis, progressive muscular atrophy and heart block. Dr. Johnston demonstrated a series of interesting x-ray films.

On the 11th of March, the Society met at the Dalhousie Clinic, when Dr. C. E. Kinley presented a paper entitled "Some Clinical Aspects of Gall-bladder Disease." This was based upon 200 cases seen by Dr. Kinley, and was illustrated by lantern slides. In respect of operation, he favoured extirpation of the gall-bladder (if there is no contra-indication) with peritonization of the bladder bed. If there should be jaundice, calcium chloride should be given before operation, to limit hæmorrhage. Post-operative treatment was described in detail. An interesting discussion followed the reading of the paper.

At the meeting held on the 25th of March, the speaker was Dr. McKim, of Montreal, who dealt exhaustively with fractures at the ankle joint. Three factors are now held to be most important: (1) abduction, of fibular flexion, (2) adduction, or tibial flexion, (3) external rotation. Of these, external rotation is most important. Direct violence and upward thrust have sometimes to be taken into account. Success in treatment depends largely upon determining the method by which the injury was produced, as this indicates the manipulation necessary to secure proper reduction. The lecture was fully illustrated by lantern slides. After a full discussion, the president expressed the appreciation of the Society for a very admirable and practical address.

On April 8th, the Society met at the Pathological Institute. The first paper, by Dr. R. A. H. MacKeen, was a most interesting statement relative to the present status of the bacteriophage problem. This was followed by an illuminating summary of our knowledge relative to the spinal fluid in diagnosis by Dr. D. J. MacKenzie. Dr. Ralph Smith then presented a

comprehensive review of the renal function tests. All three papers were of great interest and value, and brought out general discussion.

KINGSTON AND FRONTENAC MEDICAL SOCIETY

At the annual meeting of the Kingston and Frontenac Medical Society, the following officers were re-elected:—*President*, Dr. W. T. Connell; *Vice-President*, Dr. W. D. Hay; *Secretary*, Dr. P. A. McLeod; *Treasurer*, Dr. L. J. Austin.

It was decided that each Wednesday afternoon and evening should again be set aside as a half holiday for the medical profession of the city of Kingston, from May 6th until September 30th. Doctors are on call at each hospital to treat any emergency. This scheme was first tried out last year and proved a great success.

LINCOLN COUNTY MEDICAL ASSOCIATION

At the March meeting of the Lincoln County Medical Association, an address was given by Dr. F. S. Patch of Montreal, on "The relation of urological examination to abdominal diagnosis." Several interesting cases were presented by Dr. A. H. Greenwood, one of the local physicians. The attendance was 44.

At the April meeting, the subject under discussion was Health Insurance. This was the largest meeting this Association has ever held. Addresses were given by Dr. Harris McPhedran, of Toronto, Dr. J. H. Holbrook, of Hamilton, Dr. McGanity, of Kitchener and Dr. T. C. Routley, of Toronto. The District Counsellor, Dr. W. K. Colbeck of Welland, was also present and took part in the discussion.

ANNUAL MEETING OF THE MANITOBA HOSPITAL ASSOCIATION

The 10th annual meeting of the Manitoba Hospital Association was held at Portage la Prairie on June 15-16. Nineteen hospitals of the Province were represented at the meeting by fifty-three delegates. Dr. G. Harvey Agnew, Secretary of Hospital Services of the Canadian Medical Association, was the speaker at the annual banquet. He outlined the possibility of nationalization of medical services and the part hospitals would take in this development. Hon. E. W. Montgomery, M.D. was elected *Hon. President;* J. H. Metcalfe, Portage la Prairie, *President;* Miss G. A. Johnstone, R.N., Neepawa, *Vice-President;* Dr. G. S. Williams, *Secretary;* Dr. Dougald McIntyre, *Treasurer.*

HASTINGS AND PRINCE EDWARD COUNTIES MEDICAL SOCIETY

The monthly meeting of the Hastings and Prince Edward Counties Medical Society was held at Tweed on June 8th. Dr. E. E. Cleaver gave a fine address on "The importance of the medical history in the diagnosis of chronic gastro-intestinal disease." This Society is proud of the honour bestowed upon it through the appoint ment of the Ontario Medical Association of Dr W. M. Mather, of Tween, to life-membership' and of Dr. Geo. Stobie of Belleville as a District Counsellor.

VANCOUVER MEDICAL ASSOCIATION

The annual meeting of the Vancouver Medical Association was held on April 28th, in the auditorium of the Medical Dental Building. Fifty-one members were present. After the Minutes had been read and confirmed the various officers, standing committees and sections reported on the activities of the Association for the past year. For the first time in the history of the Association it was possible to report a hundred per cent paid up membership. In other respects also the Treasurer was able to report satisfactorily on the financial position of the Society.

The Executive recommended the election to Life Membership of Dr. W. F. Coy, who for many years has been one of the Trustees. The meeting was unanimous in endorsing this recommendation.

The following are the new officers and members of Standing Committees elected for the Session 1931-1932:

President, Dr. C. W. Prowd; *Vice-President*, Dr. E. Murray Blair; *Hon. Secretary*, Dr. L. H. Appleby; Dr. W. T. Lockhart was re-elected *Hon. Treasurer;* Dr. W. D. Brydone-Jack and Dr. J. A. Gillespie were elected trustees to serve with Dr. J. M. Pearson; Dr. H. H. Milburn was re-elected representative of the Association on the Executive of the British Columbia Medical Association.

THE WINNIPEG MEDICAL SOCIETY

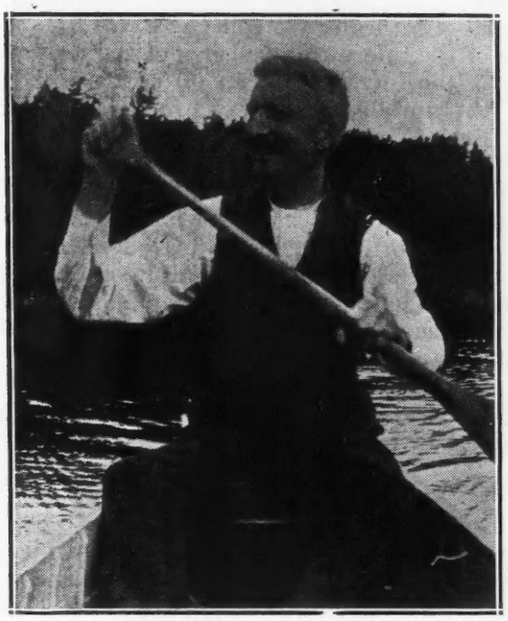
GORDON BELL—PHYSICIAN AND NATURALIST

The seventh Gordon Bell Memorial Lecture, under the auspices of the Winnipeg Medical Society, was delivered on May 8th in the University Lecture Theatre, by Hon. Dr. E. W. Montgomery, Minister of Public Health for Manitoba. Dr. John A. Gunn, President of the Society, was in the chair. Previous lecturers, Professors J. B. Collip, M. Ravenel, Oskar Klotz, E. O. Jordan, J. G. Fitzgerald, and W. H. Frost, had spoken on scientific subjects, but Dr. Montgomery, a close personal friend of Gordon Bell, dealt in an intimate way with the life and character of the scientist, physician and naturalist who, in the words inscribed on a tablet at Fox Lake, his favourite camping ground, was "a friend of all the world."

The speaker drew an engaging picture of Bell's boyhood in Pembroke where the Ottawa River and the Laurentian hills instilled in him that love of nature which came to be such a part of his being and led him on to seek in science an answer to the why which arose continually in his mind. After a brilliant course in Toronto University, under such men as Principal Wilson and Prof. Goldwyn Smith, Gordon Bell went to

Manitoba to take a course in medicine where he and Frank Wesbrook, the late President of the University of British Columbia, became ardent friends. A severe attack of typhoid led to the crippling of one leg and shut him out from further active participation in field sports, but he accepted this limitation cheerfully; indeed it seemed only to heighten his appreciation of the wonder and beauty of Nature.

After graduation in 1890 he was appointed superintendent of the Brandon Mental Hospital. Owing to an invitation to become a partner of the late Dr. J. Wilfred Good, the first specialist in ophthalmology in Winnipeg, he held the post



The Late Dr. Gordon Bell in his "Peterboro"

at the Mental Hospital only for a short time. Before beginning work as a specialist he went to Vienna, returning with a knowledge of scientific medicine and a skill in the practice of ophthalmology which made him pre-eminent in his profession.

Many of Dr. Gordon Bell's intimate friends were surprised when the firm of Good and Bell dissolved and the latter became Provincial bacteriologist. Association with a man of Doctor Good's ability and reputation was a passport to worldly success. However, Gordon Bell was practically the only man in Manitoba at that time who knew bacteriology; he was teaching that subject in the Medical School and the Province needed a bacteriologist. With a willingness to help that was constitutional, he took on the job. The opportunities for public service were the magnet that drew him from a life of well-paid and limited usefulness to the backbreaking labour and always underpaid tasks in the performance of which he spent the whole of the remainder of his life. Of his work as a teacher Dr. Montgomery said finely: "He was a teacher of science, and of scientific medicine, because in his youth he sat at the feet of Aristotle....Aristotle was a prophet and certainly a major prophet, for he said once 'Science is vital, all other forms of learning are incidental'."

Dr. Bell made but few contributions of scientific or literary value to medicine. This failure to achieve a permanent record is none the less a tribute to the character of the man. He had both the capacity and the urge for research, for scientific investigation of the most intricate and difficult kind, as well as a taste for fine literature, but he had, on the other hand, a provincial laboratory in which he did everything that the 600 doctors of Manitoba asked him to do; he had his teaching; at intervals he was Dean of the Faculty; he did almost all the coroner's post mortems in the province; and he acted as consultant at large in problems of medicine, surgery, ophthalmology and psychiatry. In consequence, the demands of the passing hour were so overwhelming, and his sense of duty so keen that he did the menial tasks of the day and turned his face with regret away from work of a far more congenial kind which would have endowed him with lasting fame. In spite of the onerous burdens he bore for others, and in spite of the handicaps he carried, Gordon Bell was conscious of having lived a useful and helpful life. This was reflected in his cheerful countenance and in his perennial good humour and is best expressed in the lines of Horace:

"The joys I have possessed, in spite of fate, are mine;
Not Heaven itself upon the past has power,
But what has been, has been, and I have had my hour."

University Notes

University of Alberta

The following are the prize winners for the past session:—

The Moshier Memorial Medal in Medicine, C. W. Weinlos; the Mewburn Memorial Medal in Surgery, R. K. Thomson. The scholarships in the faculty of medicine offered by the College of Physicians and Surgeons of the Province of Alberta for the final year were won by R. K. Brynildsen,surgery; C. W. Weinlos, medicine. The Robert Tegler Foundation Research Scholarship, Mabel R. Conibear; R. C. Hamilton.

The following have been registered as specialists in medicine and surgery: Drs. J. F. Brander, G. N. Ellis, K. A. Hamilton, S. C. Morris, J. L. Petitclerc and E. P. Scarlett.

Laval University

Appointment of five new professors for the faculty of medicine at Laval University, and choice of a director and assistant director for the Biological Institute at Trois Pistoles, was announced last night by Rev. Abbe Ph. J. Filion, rector of Laval University. The new professors in the medical faculty are; Sylvio Caron, Gustave Desrochers, Edouard Morin, Paul Gareau and Jean Paptist Jobin.

Rev Abbe Alexandre Vachon, seconded by Dr.

Arthur Dery, will guide the destinies of the Biological Institute.

McGill University

The prize winners for the past season are as follows: Holmes Gold Medal for the highest aggregate in all subjects forming the medical curriculum, first place aggregate honours in the final year, Katherine H. Dawson; Lieutenant-Governor's Silver Medal for the highest standing in general medicine, second place aggregate honours in the final year, F. L. McNaughton; Wood Gold Medal for the best clinical examinations in the subjects of the final year, H. C. Oatman; the Alexander D. Stewart Prize for the highest general qualifications for the practice of medicine, third place aggregate honours in the final year, W. E. Talbot.

University of Manitoba

The following medals and prizes were won by D. H. Williams: University Gold Medal, Manitoba Medical Alumni Medal, Dr. Charlotte W. Ross Gold Medal, Chown Prize in Medicine, Chown Prize in Surgery.

University of Montreal

Lieutenant-Governor's Medal for the best student in laboratory work, M. J. Riopelle; Hingston Medal for the student who has taken the highest marks throughout the medical course, M. J. Riopelle; Lachapelle Prize for the student standing first in the examinations of the third, fourth and fifth years, M. J. Riopelle; Nadeau Laboratory Prizes for the two students most distinguished in the interne year, first, M.J. Riopelle; second, M. R. Bolté.

Queen's University

The David Edward Mundell Scholarship of $50.00 was awarded to the student making the highest aggregate marks in the Applied Surgical Anatomy final examinations of the fifth and sixth years, J. D. Allen. The Prize of $20.00 in gold given by Dr. James, of Mattawa, for the best examination in final year medicine and clinical medicine, J. T. Tweddell; Canadian National Committee's Scholarship of $50.00 for mental hygiene, awarded to the student making the highest number of marks in psychiatry, C. A. Buck; Professor's Prize for the best series of pathological cases, J. T. Tweddell; Professor's Prize in medicine and clinical medicine, J. D. Allen; Professor's Prize in surgery and clinical surgery, J. T. Tweddell; The D. T. Smith Prize in pharmacology, R. Johnston; Medal in medicine, J. T. Tweddell; Medal in surgery, Honour, J. T. Tweddell, Award, M. W. C. Feeney.

At Queen's University convocation held in Grant Hall on May 6th, 238 young men and women received their degrees in arts and science. Dr. James A. Richardson of Winnipeg, Chancellor, presided, and presented diplomas to the graduates.

Honorary degrees were conferred upon the following: Hans Theodore Gussow, Dominion Botanist; Alfred Granville Burrows, Provincial Geologist of Ontario; Rev. Nathaniel Micklem, Professor of New Testament Literature, Queen's Theology College; Rev. Robert John McDonald; Dr. Thomas C. Routley, Secretary of the Canadian Medical Association, and Charles William Jeffreys, historical painter.

Dr. Routley replied for those who received the degree of Doctor of Laws, and Rev. Dr. Micklem for those honored with the degree of Doctor of Divinity. Dr. Micklem, who has been connected with Queen's theological faculty four years, will soon leave for England, where he will become Principal of a theological college at Oxford.

One of the interesting features of the convocation was the unveiling of an oil portrait of the late Dr. Adam Shortt of Ottawa, former Professor of Political Economy in Queen's. The portrait was the gift of Dr. Shortt's students, and was presented by Dr. O. D. Skelton, Ottawa, Under-Secretary of State for Canada, who was a student under Dr. Shortt, and afterward succeeded his teacher as head of the Political Economy Department. The portrait was accepted on behalf of the university by Dr. W. E. McNeill, Vice-Principal.

Dr. W. Hamilton Fyfe, Principal of Queen's, then addressed the convocation on "The Function of a University."

University of Toronto

The following Fellowships and prizes have been awarded: The Charles Mickle Fellowship, Sir Charles Sherrington, O.M., M.R.C.S. Eng., L.R.C.P. London, M.D. Camb., Professor of Physiology at Oxford; The Reeve Prize, W. D. M. Lloyd, M.D., M.Sc.; The Alexander McPhedran Research Fellowship in Clinical Medicine, E. A. Keenleyside, B.A., M.B.; The James H. Richardson Fellowship in Anatomy, B. R. Brown, M.D.; The Lister Prize in Surgery, S. D. Gordon, M.B.; The Starr Medal, R. M. Price, M.B.

The undergraduate awards are as follows: Gold Medal, H. N. Taube; Silver Medals, I. Smith; A. D. Irvine, The Chappell Prize (in surgery), E. S. Allin; The David Dunlap Scholarship, G. C. Armitage, The Ellen Mickle Fellowship, M. H. Book.

University of Western Ontario

The Senate of the University of Western Ontario conferred the degree of LL.D. at the Convocation on May 29th, on Dr. Jno. A. Macgregor, Emeritus Professor of Medicine; Col. W. M. Gartshore, the Chairman of Victoria Hospital Trust; Canon Cody, Chairman of the Board of Governors of the University of Toronto; and Principal Fyfe of Queen's University, Kingston.

Scholarships awarded for the past session were:

The J. B. Campbell Memorial Scholarship in Medicine was won by Cyril F. Sullivan; the

Alpha Kappa Kappa Gold Medal was won by J. Dudley Rogers; the Roche Scholarship was awarded to Thomas F. Russell and the Class of 1917 Scholarship was won by J. Beverley Robinson.

Special Correspondence

The Edinburgh Letter

(From our own correspondent)

A valuable investigation into the effect of milk consumption on the growth of school children was carried out in Lanarkshire in 1930. A report has been issued by Dr. Gerald Leighton and Dr. Peter L. M'Kinlay, of the Department of Health for Scotland. Dr. J. Parlane Kinloch, Chief Medical Officer of the Department, has contributed a prefatory note to the report. A previous Scottish test was conducted by the Scottish Board of Health in the years 1927-28 with 1,282 elementary school children in 1927 and 1,157 in 1928. The results, according to Dr. Kinloch, gave strong support to the conclusion that the addition of milk to the diet produces a marked improvement in children of all school ages, the improvement being shown by greater increase in weight and height and by better general condition. The results also show that separated milk is of great value in promoting growth, the implication being that while the diet of the ordinary household may have a sufficiency of the constituent contained in the fat of milk it is deficient in those contained in the residue. This previous test was open to the criticism, that the striking improvement in the nutrition of the children, who received the additional ration of milk was due, not to the milk alone, but in some measure to improved home conditions—food, sleep and regulation of life—which might follow from the close surveillance which was kept over the children under test. In the 1930 investigation some 20,000 school children were included, 10,000 of the children receiving daily a supplementary ration of milk over a period of four months, the remaining 10,000 serving as controls. Bulked Grade A (T.T.) milk was used throughout the test, and in order to investigate the relative values of raw and pasteurized milk one half of the milk was pasteurized. Dr. Kinloch considers that the results, read along with the findings of the previous Scottish tests, are conclusive on the main issue. They demonstrate that the addition of milk to the diet of children has a striking effect in improving physique and general health, and increasing mental alertness. They suggest, also, that apart from its own food value, milk enables the other constituents of the ordinary diet to be fully utilized as growth factors. The question of the relative merits of pasteurized and raw milk remains open; but it would appear that pasteurized milk, like separated milk, as a supplementary ration to the usual mixed and various diet of the household is a potent growth-producing factor. This last conclusion that raw and pasteurized milk are equal in their effect on growth, on weight and on height has been contested by Dr. R. A. Fisher, F.R.S., of the Rothamsted Experimental Station, and Captain S. Barlett, M.C., B.Sc., of the National Institute for Research in Dairying, University of Reading, who declare that in reality the reverse is the case. At the same time there is a very general and definite opinion by a number of observers, teachers and others that the appearance of the milk feeders showed quite an obvious improvement after the scheme had been in operation for six or eight weeks. A distinct improvement was also observed in the mental capacity of some of the children. The results give a special significance to the new powers conferred on Local Authorities by the Education (Scotland) Act, 1930. Under that Act, Local Authorities may make an additional ration of graded milk available to school children. In view of the results of the Scottish tests, it would be difficult to exaggerate the importance of the new powers. Their universal exercise by all the Local Authorities would affect about 800,000 children (the total school population in Scotland) and by improving their physical and mental well-being would have a powerful influence in improving the quality of the Scottish race. Indirectly by greatly increasing the national consumption of graded milk it would have another important result. It would lead to the rapid elimination of tuberculosis from the dairy herds of Scotland, and so to the prevention of many crippling disabilities from which the population suffer at present.

Obstetricians and gynæcologists who have been attending the eighth British Congress in Glasgow during the month of April were present at an interesting ceremony in St. Kentigern's Old Churchyard, Lanark, when Prof. Munro Kerr, of Glasgow University, unveiled a memorial stone to Dr. William Smellie. In an address Dr. J. Haig Ferguson, President of the Royal College of Surgeons, Edinburgh, explained that the restoration of the tomb had been undertaken by the Obstetrical Societies of Edinburgh and Glasgow. This scheme originated from a suggestion by the late Sir A. R. Simpson of Edinburgh. Smellie has been described as the greatest of British accoucheurs. He was one of a celebrated band of Lanarkshire men who made their influence felt not

only in Glasgow and Edinburgh but also in the great metropolis of the South. His contemporaries from Lanarkshire included the illustrious William Cullen, the brothers William and John Hunter, and Matthew Baillie. A friendship that existed between Smellie and Dr. John Gordon, President of the Glasgow Faculty in 1755, suggests that Smellie had the same teacher as Tobias Smollett and John Moore, the father of the hero of Corunna, both of whom forsook medicine for literature. Smellie was born at Lanark in 1697. He practised first in his native town and later moved to London where he took up residence in Pall Mall, and began practice as an accoucheur and apothecary. He retired in 1759 and spent the last four years of his life in Lanark.

In connection with the Edinburgh Post-Graduate Courses, a series of clinics, restricted to graduates, was given in the Wards on the Medical Side of the Royal Infirmary during the month of May. All the Physicians in charge of Medical wards participated in this course. In addition demonstrations were given in the Radiology Department by Dr. Duncan White.

The Governors of the Glasgow Royal Hospital for Sick Children propose to initiate an orthopædic scheme. This organization will consist of a hospital in Glasgow with special equipment, and a staff of expert surgeons, masseuses, etc. This staff will receive and treat the special cases requiring such facilities as are only to be obtained in the hospital. They will be in direct association with and advise as to the treatment to be given at local centres. In addition to the hospital, clinics will be situated at suitable places in and around Glasgow, and in the centre and west of Scotland. There crippled and deformed children will be looked after locally and receive such simple treatment as may be directed from the hospital. A similar hospital for orthopædic cases in Edinburgh and the south-eastern counties of Scotland has been in construction for some time and should be ready within the year.

In the last few weeks the Edinburgh School of Medicine has lost two of its most eminent teachers. Sir Byrom Bramwell died in Edinburgh on April 27th in his eighty-fourth year. Students of a quarter of a century ago, when he was at the height of his powers, will remember him as a great clinician. His famous Wednesday Clinics attracted eager bands of students. During thirty years from the time when he first started practice he produced more than 160 communications to medical literature. He was President of the Royal College of Physicians of Edinburgh 1910-12), and an Honorary LL.D. of the Universities of Edinburgh, St. Andrew's and Birmingham. Professor Lorrain Smith, who died on April 18th, was Professor of Pathology and Dean of the Medical Faculty in Edinburgh University. He was a graduate of Edinburgh and returned to his Alma Mater after a period of notable achievement at Queen's College, Belfast, and at Manchester University. He was an honorary graduate of the Universities of Belfast and Manchester and a Fellow of the Royal Society of London. During the war he devoted his attention to the problem of wound sepsis. With his assistants he devised the well-known hypochlorite solution, eusol (Edinburgh University Solution) which was so extensively used at that time in the treatment of septic wounds.

GEORGE GIBSON.
23 Cluny Terrace, Edinburgh.

The London Letter

(From our own correspondent)

The past month has seen several important happenings in the medical world. One of the most interesting was the celebration of Florence Nightingale's birthday on May 12th as Red Cross Day, a "day" which it is hoped will become a settled annual event. The work of the Red Cross in peace-time has frequently been mentioned in these notes, and last month's letter contained a reference to the splendid "Rheumatic Clinic" in London. The choice of May 12th as a day for the recognition of the claims of this work throughout the Empire is particularly appropriate, for it was, so to speak, out of the war-time struggles in the Crimea that Florence Nightingale evolved her peace-time ideals for the nursing profession. It is not always remembered that side by side with her successful combat with officialdom and her realization of the necessity of a deep vocational call for the nursing profession this great character insisted that a nurse must receive a thorough scientific training, and then must be fitted in as a unit in an organized scheme of practical preventive and curative medicine. It is all to the good that we should be reminded of these things as the "Nightingale Day" comes round each year in the future, so that those closely concerned with the training of nurses may consider whether red tape, out-of-date traditions and other drawbacks to the nursing profession are not hindering the proper development of this important branch of medical service. The "Lancet" Commission on Nursing, already mentioned in these notes, is a step in this direction.

The end of May saw the publication of the most important "Proprietary Medicines Bill", by which yet another attempt is to be made to deal with one of the crying scandals in this country. It is to be hoped that Mr. Somerville Hastings, who introduced the Bill, will

have better luck than some of his predecessors in their parliamentary attempts to correct this evil. Under the new Bill it is proposed that all "patent remedies" shall be registered and the ingredients of any medicine disclosed in confidence to the responsible authority, or in the case of appliances, specimens shall be deposited. Secondly, it is proposed to prohibit entirely the direct distribution to the public of remedies for certain scheduled diseases, and the proposed list comprises cancer, consumption, lupus, fits, epilepsy, amenorrhœa and other diseases peculiar to women, diabetes, paralysis, locomotor ataxy and Bright's disease. The third part of the Bill is concerned with certain forms of undesirable advertising. Here one very important section would effect the prohibition of all advertisement of remedies for venereal diseases or relating to "sexual weakness"; another part seeks to defend professional publications from misquotations in advertisements, while a false trade description of any proprietary remedy is to be heavily penalized. If this Bill becomes law—and there is, unfortunately, no chance of this during the present session of Parliament,—it should, in conjunction with the new "Pharmacy and Poisons Bill," to which reference was made last month, go far to remove one of the blots upon the modern campaign for health which so far has failed to attack strongly the vested interests represented by patent medicines and slum property. While Mr. Hastings has the backing of all his professional colleagues in his efforts with this new Bill he is not so popular in his position as president of the Socialist Medical Association. And yet he said a great many things in his recent presidential address to the Association which must be faced by the profession in the future. For example, it is perfectly true that "prevention" is not being properly taught in our medical schools, where the commercial value of preventive medicine, as against old-fashioned or even modern methods of treatment, is considered as negligible. (That prevention is also paying for the practitioner was admirably shown by Prof. Alan Brown in this *Journal* recently.)

Mr. Hastings also urged the importance of health propaganda and said that in the medical service of the future the doctor must work rather as a part of a team than as an isolated individual. The importance of establishing "medical centres", rather than a series of small, competing hospitals, is also a subject with which many will agree. The new organization admits frankly that it is out to educate the lay and medical public in its ideas and if it only serves to make us all think it will do good work.

ALAN MONCRIEFF

London, June, 1931.

The South African Letter

(From our own correspondent)

The medical profession in the Union of South Africa numbers, according to the latest issued Register published in March last, 2,232 persons. That number, however, must not be taken as representing the number of doctors actually in practice. Excluding those who are retired, living outside the Union and included in the Register only for purposes of record, as demanded by the Medical Act, and who are no longer following the practice of their art, there are approximately 1,650 practising doctors in the Union, of whom 1,420 are members of the Medical Association of South Africa. This Association was formed in 1926 by the amalgamation of the British Medical Association and the South African Medical Association. As a result the amalgamated Associations, under a memorandum of association with the British Medical Association in England, agreed to merge into a new body which was to be known as the Medical Association of South Africa (B.M.A.) its branches to be acknowledged as branches of the parent British Medical Association, and its articles of association to be in close cooperation with that body. This generally satisfactory result was the outcome of long negotiations and considerable discussion. There was at the time of the amalgamation considerable awakening of nationalistic feeling in South Africa, and the lay public was eagerly, and in some quarters aggressively, discussing the constitutional relations between England and the Dominions. In the circumstances it was only natural that in the profession, too, there should have arisen a feeling that South Africa should have its own medical association. No one who had really worked hard for either the South African or the British Medical Association was antagonistic to the latter. All agreed that what had been done by the British Medical Association in South Africa had been done for the benefit of the profession at large. But there was a natural desire for autonomy and the amalgamation of the two associations under the ægis of the parent association into one new association was an admirable way out of a difficulty that threatened, at one time, all sorts of further difficulties.

At present the Medical Association of South Africa (B.M.A.) may be looked upon as thoroughly representative of the practising profession in the country. It has 12 flourishing Branches and 34 Divisions. One of the branches functions in the Mandated Territory of South West Africa. Owing to the large extent of the country and the difficulty of transport, it is often a matter of considerable expense of time and trouble for members to attend branch meetings. A motor trip of 200 miles over

execrable roads is no rarity for such members as live in the country areas, while members of the Federal Council, which meets three times a year, may have to travel ten times that distance to attend a meeting. Notwithstanding these drawbacks meetings are, in the circumstances, well attended, and considerable interest is displayed in both clinical and professional business.

The profession in South Africa may roughly be divided into five groups. At the head stand the comparatively small number of pure specialist-consultants, who are also teachers in the medical faculties of the two Universities that have a medical school, Cape Town and Johannesburg. The country has not yet learned to appreciate consultants, and does not, as yet, draw a sharp distinction between the general practitioner who goes his round of private house visits, and the practitioner who confines himself to one subject and only sees patients on the recommendation of another practitioner. The second group comprises the men who are employed as whole time medical officers in the government service, either in the public health department or in the mental hospitals or leper asylums. They are now recruited largely from local graduates, as the conditions of service postulate that an applicant shall be bilingual, knowing English and Afrikaans, and have resided three years in the country before he can apply. The third group consists of whole time doctors in the employ of the municipalities. These are highly expert, well paid specialists, recruited in the open market, with the result that the large corporations have been able to secure the services of men who are an asset to the country at large. The fourth group consists of the general practitioners in town and country, who generally hold part time appointments of varying value, and who form the largest and most important medical group in the country. They may be mine doctors, railway doctors, or district surgeons, in addition to having a large general practice. The fifth, and smallest group, is that formed by the medical missionaries, who practise in native areas, who combine medicine with religion and are generally financed by sectarian societies. Out of our 2,232 doctors on the Register 134 are women, and we have the honour of counting among them the oldest woman graduate in the Empire, Dr. Jane Waterston, who for many years has been an active and keen member of the Association, and has now been elected one of its two honorary members in recognition of the good work she has done for more than sixty years of practice in this country. There are several natives on the Register, all men who have qualified abroad. Our first native doctor, whose sons are respectively a doctor, a veterinary surgeon and a dentist, qualified in the early sixties of the past century, but South Africa has not encouraged the entry of native students into its medical schools and natives who wish to graduate must go to Edinburgh or Glasgow.

Just now there is considerable discussion on this point of the education of natives in medicine. It is generally recognized that medical service for the native territories is inadequate. There are approximately two medical men for every 110,000 natives in these territories, a figure that on paper seems appallingly large. In practice it is not quite so alarming. The native although he is not, as is sometimes supposed, immune from cancer, chronic constipation, catarrh and every other disease that afflicts civilized man, is on the whole healthy and satisfied with such medical service as his own native cures can give him. Infantile mortality is high among the natives, but that mortality is gradually falling. No one wishes to minimize the extent of the inadequacy of the medical services in native areas, but that inadequacy is sometimes dealt with as if it stood alone, whereas is is merely a part of the general want of adequate medical attention for the entire rural areas of the Union. The back districts are now served by general practitioners who usually have to struggle without adequate nursing or hospital help, receive no settled remuneration, and often have to expend a large sum in capital expenses before they can make any headway. They sometimes act as district surgeons and receive a monthly honorarium from the government. In some quarters there is a wish to extend this system of district surgeons and to link the rural practitioner with the public health service. Whether that is the ideal way out of the difficulty remains to be seen. There is some analogy between the difficulties of the medical profession and those of the teaching profession so far as the backveld districts are concerned. Both should be served by their best, and best paid men, and both are at present served by men who cannot count on making enough out of their service to retire before they are broken down by age and ill health. This is especially the case in malarious districts.

The problems of medical services in rural areas is not the only one that is before the South African profession to-day. There is the matter of the cooperation between the medical practitioner and the medical faculties of the universities—the question of the exploitation of the profession by the government and by the public in the name of charity — the problem of the treatment of free patients in hospitals—research work, medical ethics, and other subjects of perhaps minor import. Formerly, few of these matters could be tackled with any hope of securing even the opinion of the profession upon them. Now, thanks to the influence and prestige of the Medical Association of South Africa, it is possible to deal with them all. So far they

have not been dealt with; merely touched. But the work that has been done during the past three years is highly encouraging, and leads one to hope that in time South Africa will have a very solid, organized, and effective medical profession.

C. LOUIS LEIPOLDT.

Cape Town, May 16, 1931.

Letters, Notes and Queries

Glycosuria in Insurance Examinations

To the Editor:

Will you give me space in the *Journal* to sound a note of warning to medical referees of insurance companies. The following situation has been brought to my notice more than once. An applicant for a policy shows glycosuria on routine examination for insurance, the agent, acting on instructions from his medical referee, asks the physician who does the examination for the company to give the applicant 100 grams of glucose, then the urine is examined with or without blood sugars at intervals during the next few hours.

It is a well known fact that 100 grams of glucose administered to a true diabetic can do a great deal of harm. If medical referees would bear this in mind and be more careful about the administration of large quantities of glucose before blood sugars have been done it would save the true diabetics the shock of a large dose of glucose and the potential diabetics the extra burden which they are badly fitted to endure. Of course the renal glycosuric stands the glucose well. Yours truly,

LILLIAN A. CHASE.

Regina, June 13, 1931.

Topics of Current Interest

The Value of Liver in Treatment

A discussion on this subject, at the meeting of the Royal Society of Medicine, London, on March 24th, was opened by Dr. Janet Vaughan.

The anæmias could be classed according to their response to liver. Those responsive to liver and stomach extracts included idiopathic pernicious anæmia, sprue, the pernicious anæmia of pregnancy, and pernicious anæmia associated with intestinal lesions. This group was characterized by a deficiency in the gastric digestion of protein and a megaloblastic hyperplasia of the bone-marrow. Clinically and experimentally it seemed likely that the effective principle in liver and stomach extracts was essential to the normal development of megaloblasts and that it was elaborated by the gastric digestion of protein. The liver and kidneys were probably only storage depôts. When faulty gastric function prevented the development of this principle the megaloblast was unable to develop and therefore proliferated.

The second group, consisting only of secondary anæmia after hæmorrhage, was responsive to whole liver and not to extracts.

The third group was responsive to whole liver, and also to iron. It included secondary anæmias associated with starvation, cancer, hæmorrhage, and deficient dietary in children. In the second and third groups there was no defect of protein digestion, but there was often achlorhydria. Megaloblastic hyperplasia did not, therefore, occur, and extracts, which only contained the principle affecting megaloblastic tissue were useless. The deficiency was perhaps due to faulty absorption of both iron and the second factor present in whole liver, the failure depending on achlorhydria. Iron was more readily absorbed, in small doses, from an acid than from an alkaline medium.

A fourth and fifth group were constituted respectively by anæmias and blood diseases, irresponsive to liver: simple achlorhydric and aplastic anæmia and secondary anæmias associated with leukæmia, sepsis, nephritis, Banti's syndrome, acholuric jaundice, cirrhosis, and scurvy; and hæmophilia and purpura hæmorrhagica. Some observers had claimed that these two blood diseases responded to liver, but Dr. Vaughan's experience had not confirmed this claim.

She described work on grain-fed pigeons, showing the effect of liver feeding on the marrow and blood cells. The reticulocytes in pigeons were increased in number and altered in character by effective doses of liver. The reticulum was more densely stained and the nucleus much more immature. The results had been obtained whether the liver was given by mouth or intravenously, except when sepsis was present, but no response had been given by clinically inactive extracts or control substances, with the exception of beef-steak.

Intravenous administration was ideal in acute cases, but not always possible, and the best substitute was massive oral feeding. The need was to give as much as possible in the shortest possible time. If the patient could not swallow heroic doses such as 3,000 g. the liver must be given by stomach-tube or per rectum with saline or glucose. It was possible to calculate to within 1 per cent the level to which the reticulocytes would rise in a patient. There was an accompanying increase in the serum uric acid, a fall in the serum pigment, and disappearance of iron from the tissues. The red-cell count must be kept above 4 million.

Extracts were very much more effective than whole liver.

The factors in liver affecting blood production were as specific in their action as vitamins or endocrines. Minot had shown that the anæmia of scurvy was influenced by orange-juice, although liver and iron were ineffective. Liver was only of value in anæmia when it could supply some already existing deficiency. A greater quantity of liver was required to affect a cord lesion than to alter the blood picture; there had been a failure in the past to appreciate the need for adequate doses.

Certain factors could affect the absorption of liver: sepsis, nervous lesions, arteriosclerosis, and iron and thyroid deficiencies. If they were present the dose must be doubled or trebled. A mild sepsis might account for inability to keep the blood count up, and should be found and treated. Old people often needed a higher maintenance dose than younger ones. Thickened vessels might cause some failure of absorption of essential substances, as other deficiency diseases were apt to occur in arteriosclerotics. Iron deficiency might occasionally affect acute cases, but was very often a definite factor in maintenance-dose cases. A certain small group of cases with lowered basal metabolic rate did not respond properly unless thyroid were given as well as liver. Liver therapy could only receive justice if these factors were realized and the necessity of an adequate dose was grasped. An "adequate" dose was usually one that appeared to be absurdly large.—*The Lancet,* 1931, 1: 702.

Noise in a Big City

The exploding of a paper bag will raise the brain pressure as high as four times the normal for a period of seven seconds, with a thirty-second interval before normal pressure is again attained. "Occupational deafness" is increasing among city workers, due in large part to the exhaustion of the muscles of accommodation. City dwellers are becoming neurotic from disturbed sleep and the effort to overcome the effect of noise. The normal development of infants and young children is seriously interfered with by constant loud noises. These are among the thought-provoking conclusions of the medical committee of the special Noise Abatement Commission, which has been studying various aspects of the noise problem in New York City, and has now published its studies in a 300-page report entitled "City Noise".

This study, sponsored by the Commissioner of Health, and conducted by leading acoustical engineers and physicians, has been supported by the public utilities and other big corporations interested, the press, the police, interested manufacturers, and research societies. A special sound-testing truck, equipped with the latest audiometer and other apparatus, made thousands of readings under varying conditions both indoors and outdoors. Questionnaires published in the press were returned in large numbers. As would be expected, trucks, motor horns and the neighbours' radios received most condemnation from the public, but this scientific study of the various sources of noise revealed a ratio of sound values that might not have been anticipated.

The unit of sound intensity used in this study is the *decibel,* zero being the threshold of hearing. Decibels are not absolute units of loudness, but indicate a *ratio of intensities.* For instance ten decibels of noise means an intensity of 10 above the threshold of hearing; twenty decibels, an intensity of 100 (or 10^2); thirty decibels, an intensity of 1000 (or 10^3), etc. Thus the increase in intensities involved is tremendous; for example, a pneumatic drill at 10 feet distance (90 db.) is one hundred times more intense than thunder at one to three miles (70 db.), and one hundred million times as intense as rustling leaves or a whisper (10 db.), yet the pneumatic drill makes a noise but one five-hundredth as intense as the noise of the aeroplane engine (115 db.), which in turn is 500 billion times as intense or loud as the sounds at the threshold of hearing (0 db.). The following table, assembled from several such in the report, indicates the relative intensity of sounds from a number of common sources. With one or two exceptions as noted, average readings are given.

Decibels	*Source of Sound*
130	Threshold of painful sound
116	Aeroplane motor (1,600 RPM.) at 18 ft.
113	Hammer blows on steel
102	Maximum automobile horn
98	Riveter, at 35 ft.
96	Blast of explosives
95	Subway, at local station, express passing
94	Steamship whistle
90	Pneumatic drill, at 10 ft.
87	Lion roaring
80	Loud radio music in the home
74	Average motor truck, at 15 to 50 ft.
70	Noisy restaurant
70	Thunder (1 to 3 miles)
64	Ordinary conversation (outdoors), at 3 ft.
54	Noisy office
44	Average office
32	Average city residence (inside)
24	Country residence (inside)
20	Quiet garden in London
10	Rustle of leaves
10	Quiet whisper, at 5 ft.
0	Threshold of hearing.

In some places the level of street noises is so high that a Bengal tiger could roar his hardest without attracting attention from passersby. Oddly enough, that archdevil of all causes of street noises, the steel-riveting machine, as heard

at the street level, makes a noise almost always less than the normal noise of traffic on a busy street. Our annoyance at this staccato disturbance is due in large part to its intermittence, and in part to the summation effect produced by this noise, plus the ordinary traffic sounds. Two suggestions are made, one of which is novel; fusion-welding might replace riveting and the idea is put forward that if the machines rat-tat-tatted steadily rather than intermittently they would be actually less annoying.

A study was made to determine the influence of noise on efficiency. In experiments with office workers it was found that a 50 per cent reduction in noise brought a 5 per cent increase in the production of typists. In a noisy room the metabolism of workers was 19 per cent higher than in a sound-deadened room. "Noise is on the payroll of the average business organization in the form of impaired efficiency or costly nervous strain". It is even suggested that noise is a precipitating factor in crime, as crime and hysteria are closely related.

Many sounds were found to be louder than actually necessary. For instance, a steamboat whistle was so loud that the noise recorded a level of 75 decibels in a room one-quarter of a mile away. Motor horns came in for considerable criticism; 42 per cent of the many horns tested were louder than was necessary to override the loudest average noise levels on New York streets. It is safe to presume that a still higher percentage would be found louder than necessary to overcome the lower noise levels in smaller less congested centres of population. Truck drivers, garbage collectors, youths who sit in parked cars and "honk" for their friends rather than ring the doorbell, store front loudspeakers, apartment-house radios, aeroplanes, all came in for a goodly share of condemnation. An interesting observation is that in the average New York theatre we hear only about 65 per cent of the spoken words, owing to traffic noise leaking in through the lobbies and exits and to the coughing, whispering and shuffling of the audience.

The Noise Abatement Commission has received already enough evidence of cooperation to be of the opinion that considerable improvement may be anticipated. Automobile horn manufacturers are cooperating to produce horns with fewer inharmonic overtones. The subway systems are experimenting with muffled turnstiles. Steamship and railroad companies have taken further measures to minimize whistling; the police have discontinued traffic whistles; street radios have been prohibited. Efforts are being made to prohibit the sounding of horns by automobiles not in motion and to restrict hours of noisy building operations. Above all, a new code of noise etiquette is needed by city dwellers. More attention must be paid to acoustical treatment in the construction of buildings. Hospitals and schools should not be built on main thoroughfares, nor at street car intersections. Furthermore, it is recommended that institutions like hospitals use smaller buildings to shield them from traffic noises. These points might well be considered in other cities and towns, even though their noise levels may not be so high. It is hoped that this report will stimulate other communities to minimize this annoyance.

HARVEY AGNEW

The Socialist Medical Association

The first annual general meeting of the Socialist Medical Association was held in London on May 10th, when Mr. Somerville Hastings, M.P., delivered his presidential address. Speaking of the future of the profession, he said that a knowledge of preventive medicine, which at present occupied a very small place in the curriculum, would become more and more important as the necessity for health propaganda and for a periodical medical examination increased. The medical profession had suffered too long from insulation; the team and not the doctor was the unit of the future. Any doctor working alone in competition with other doctors was apt to degenerate professionally; he became autocratic. Every person who applied for the service of a general practitioner should be provided with it. Mr. Hastings suggested that to every doctor of this class should be allotted about 3,000 persons. Where a hospital existed there should be a medical centre attached in which were situated consulting rooms, so that ante-natal care, child welfare, treatment of tuberculosis and venereal disease, and school clinic work could be carried on in one building. Speaking of hospitals, Mr. Hastings said that all such institutions should be linked together to form a single system; thus, cases could readily be transferred from one hospital to another. There should be a general hospital with a staff of specialists for every county.

Dr. Alfred Salter, M.P., said that public prejudice in medical matters would be very difficult to overcome. It would be a long time before the "family doctor idea" could be swept away. Any radical changes must be effected gradually and with the backing of the mass of the people.

The report of the executive committee was approved. It states that although the Socialist Medical Association was formed only in October, 1930, it has already justified its existence; until there is a larger membership, however, it is inadvisable to affiliate with the National Labour Party. One of the principal objects of

the association is to devise practical measures for the establishment of a free socialized medical service, and to give effect to this a research subcommittee was appointed to which evidence has been submitted by the British Medical Association and other organizations. An educational subcommittee has also been formed; this body will undertake propaganda work by contributions to socialist newspapers and periodicals, and by lectures to members of the trade union, labour, and cooperative movements. The establishment of territorial branches has begun. The London and Home Counties Branch was instrumental in the production of the pamphlet, "Labour's Hospital Policy for London," which has had official recognition. It is proposed to send a delegation to the coming international conference of socialist physicians at Carlsbad. Several resolutions opposing charges for treatment at municipal hospitals were agreed to, and the opinion was expressed that municipal and hospital treatment should at once be dissociated from the Poor Law. It was also agreed that the income limit for National Health Insurance purposes ought to be raised to £500 a year.—*Brit. M. J.*, 1931, **1**: 865.

Hospital Lotteries

In the House of Commons on Tuesday, May 19th, Sir William Davison asked leave to introduce the Hospitals Lotteries Bill, a measure to authorize the raising of money by means of lotteries for the support of hospitals. He said that he had sent to the Home Secretary a memorial signed by 70 Members of the House belonging to all parties asking him to take this matter into consideration. He had also furnished Mr. Clynes with the results of a questionnaire which was recently sent out by the Special Appeals Committee of St. Bartholomew's Hospital to some thousands of representative people, including supporters of the hospital. The result of that questionnaire to date was that 3,125 persons were stated to be in favour of a lottery for the hospital and only 61 were against. Meanwhile, nothing was being done and British hospitals were in the greatest need of funds for building, equipment, and maintenance. He was aware that a number of Members of the House of Commons considered that hospitals should be a charge upon the State. But even they must surely realize in view of the statements of the Chancellor of the Exchequer in presenting his Budget that it was not practical politics in present financial conditions to provide State money for hospitals. The Chairman of a large hospital, in a letter to the *Times* a few weeks ago, pointed out that hospitals were being seriously prejudiced by reason of the uncertain state of the law in regard to this matter, and he added that they were losing subscriptions both from those in favour of lotteries and from those who were opposed to them. That supported the view that it was time that this uncertainty of the law should be ended, at any rate so far as hospitals were concerned. Immense sums have been raised in Dublin in aid of the Southern Irish Hospitals.

The Bill which he was asking leave to introduce was an unambitious measure. It did not attempt to modify or remove the many anomalies relating to lotteries, raffles, and sweepstakes. It was a short permissive measure which left the law as it stood until such time as the Government were in a position to deal with it. The Bill provided that notwithstanding anything in the existing law a lottery might be held under regulations to be approved by the Home Secretary for the benefit of British hospitals something on the lines of the Irish Free State hospitals lottery, but with improved regulations as a result of experience gained in the conduct of that lottery. This Bill would not refer to Northern Ireland. There was nothing inherently vicious in the idea of a lottery. It was bad for the country that the law should be openly broken by all classes, and with general approval, as it was being to-day. This Bill would be of immense benefit to the hospitals and through them to the sick and suffering people of the country.

Mr. Foot, who opposed the Bill, said that it prejudged inquiry and demanded from the House a verdict before the evidence had been given. The Bill could not be limited to hospitals. If it was right for hospitals, it was right for the blind, for orphanages, and for every beneficent enterprise, national and municipal. This was a charity lottery which would not achieve its purpose, but would dry up the resources of charity. The man who would buy a sweepstake ticket would be tempted to feel that he had discharged his responsibility. In the Dublin sweepstake of November, 1929, £798,433 was raised from the sale of tickets, and of that sum £249,000 went in expenses and organization, and £417,000 in prizes. Out of the £798,000 the hospitals took only £131,000. Out of each 1s. ostensibly raised to help the sick, 2d. went to the avowed purpose of the scheme. A short time ago the Earl of Onslow, at one time chairman of the Voluntary Hospitals Commission, wrote to the *Times* setting out his reasons for condemning the proposal as disastrous to the financial interests of the hospitals of this country. The same opinion was given by the chairman of the Royal London Ophthalmic Hospital, and by Sir Arthur Stanley, Treasurer of St. Thomas's Hospital.

The *Manchester Guardian* sought the opinion of 13 prominent members of the Manchester Hospital boards. Two declared in favour of the proposal, one was neutral, and ten declared against it. The House Governor of the Charing Cross Hospital, Mr. Philip Inman, in an interview this month, said that he and the hospital would have neither part nor lot in any such schemes. Their reasons were not simply moral ones, although they weighed very considerably. Looking at the matter simply from a business standpoint, they believed that the gains would be outweighed by the losses. This proposal, Mr. Foot added, screened cupidity with a thin smear of charity. The Good Samaritan would have taken a very different place in history if he had sought to discharge his responsibility to his distressed neighbour by spending his 2d. on the purchase of a ticket in the Jericho Hospital Sweepstake. Speaking a few weeks ago, Sir Alan Anderson, chairman of the Hospital Saving Association, said: "Illness is not a gamble, and it would not accord with the principles on which the Hospital Saving Association appeals to its members to base the finance of healing on the unstable foundation of gambling." The hospitals of this country ought not to be built on the very shifting and uncertain sands of chance and cupidity.

Leave to introduce the Bill was refused by 181 votes to 58.—*The Lancet*, 1931, **1**: 1164.

Medico-Legal

INSANITY AS A CRIMINAL DEFENCE*

A REVIEW

BY HORST OERTEL

Montreal

This monograph, written within wise limits (141 pages), should be in the hands not only of all medico-legal experts but of every practising physician, for it deals with matters which go far beyond the scope of the specialist, and concerns equipment and information which should be at the disposal of every practitioner of medicine. It represents in clear and concise language the legal side of insanity in relation to responsibility. While it is principally written from the standpoint and practices of English courts, it takes cognizance of Canadian opinions and adds useful references in regard to the attitude and decisions of American States. The questions here discussed are of common occurrence, frequently raised in defence of a prisoner and in the commitment of persons to, and retention in, asylums. The unusual prominence given of late to insanity as a plea in criminal cases has intensified the general interest, but also the bewilderment in which lawyers, courts and juries often find themselves. Even the expert medical witness faces greater difficulties to-day as regards the declaration of soundness or unsoundness of mind than ever before. An alarming variety and increasing haziness in conceptions and terms in this connection have long called for a sober exposition of this subject, and the reader must feel grateful to the author for having undertaken this involved task with success.

The difficulty in regard to the plea of insanity lies, as elsewhere in human pathology, in the formulation of a comprehensive, clear-cut definition which will serve the practical purposes of law enforcement and thus, not unlike the "*actio finium regundorum*" in Roman law, draw sharp boundary lines between what is sound and unsound. But such a definition is scientifically impossible, because soundness and unsoundness of body and mind are not absolute but relative distinctions, which depend upon shiftings in physical and mental processes and not upon particular fixed characteristics which are specific to one and not to the other. The idea of a physical or mental illness is, therefore, based on the totality of a concrete personal picture, not upon isolated points or acts. This is clearly expressed by the distinguished psychiatrist, Siemerling, who points out that "the diagnosis of mental competency or incompetency rests not on the psychological interpretation of the incriminating act but upon the physical and psychical behaviour of the whole individual as determined by immediate observations and antecedent history." He further adds that "there is not one act which considered by itself proves psychical unsoundness in a person. The duty and judgment of the medical witness lie, therefore, not so much in a characterization or classification of an act as in the investigation of the physical and psychical conditions of the whole individual with a view to his peculiarities which prompted the criminal act."

The all-important legal question in a criminal case centres, of course, in the "guilty mind"—that is, is the criminal incapable of knowing that he is doing wrong, or was there a gulity intention (*mens rea* or *dolus malus*)? Thus Cicero already states: "*In vi dolus malus inest*", (the crime of violence includes malice). The significance of this all important "mental element in crime," as the author calls it, is considered in the introductory chapter and from the legal standpoint, at least, the crux of the whole matter of insanity as a defence plea lies in it. Consequently, the author proceeds to a detailed statement and discussion of the interesting and far-reaching legal opinions in reference to the epoch-making McNaughton case (1843) in England. These are presented clearly and illuminatingly in their adoption, application and possible criticisms. The McNaughton rules, which subsequently were

* Insanity as a Criminal Defence, by W. C. J. Meredith, Montreal. Price $2.50. Published by Wilson & Lafleur, 5 Notre Dame Street East, Montreal, 1931.

largely followed throughout the British Empire and elsewhere, put the weight of criminal responsibility on the knowledge of the accused as regards the nature and quality of his act, and therefore treated insanity as a valid criminal defence entirely on individual reflecting grounds. It is pointed out by the author that the weaknesses and onesidedness of the McNaughton rules—that is, lack of proper recognition of will and emotions in regard to criminal acts—challenged opposition and opened the further question of an "impulsive insanity" or that of "irresistible impulse." The author covers this in the ninth chapter of the monograph in a lucid account and analysis, points out and quotes the divergent views of judges and legal committees, and adds particular interest by the citation of instructive actual cases.

The rest of the book is given over to procedure, motive, insanity in relation to suicide, and to diseases allied to insanity, such as epilepsy, sleep-walking and sexual offences. The concluding chapters deal with American practices and modifications of the McNaughton rules and in the last chapter some modern medical opinions as regards the right or wrong under the McNaughton interpretations are added.

That the defence of "insane or irresistible impulse" is liable to great abuse and may defeat the purposes of justice has been amply demonstrated by some notorious recent murder trials in the United States. On the other hand, in a recent case in Germany, a murderer of the "Jack the Ripper" type was declared by the medical experts, who advised the judge (in conformity with the rules laid down by Siemerling, quoted above), as sane and was sentenced by the judge to death for each offence (9 times!) with an additional fifteen years in a State prison, permanent loss of all civil rights and the costs of the trial—certainly a thorough rejection of the plea of irresistible impulse. English courts also have been generally averse to accepting it as a plea of defence. In view of the possibilities of abuse of the plea of impulsive insanity, which may, as experience shows, easily impose upon a sentimental group of jurors, one cannot help but sympathize with the opinion expressed by Dr. William White, as quoted by the author, that the jury's function should be confined to decide whether the crime charged had been committed, but that judges and state authorities should employ impartial expert witnesses, and then settle the question as to whether the prisoner was insane or sane.

It is an advantage for the purposes of this monograph that theoretical discussions or consideration of abstract principles are reduced to a minimum, but that the main effort is concentrated on the presentation of concrete instances and occurrences which are illustrative of particular points or questions. The historically important (1800) Hadfield case might here be mentioned (Appendix I), for it embodies the transition from the older, primitive, legal definition of insanity, as "a total deprivation of memory and understanding" to that of "delusion," and thus paved the way for the later McNaughton rules.

No one will put this book aside without feeling that it has added to his own knowledge and experience of an important side of social life, and that it may, when occasion arises, be readily referred to for the sake of instance and comparison.

Abstracts from Current Literature

MEDICINE

An Analysis of 500 Instances of Hypertension. Nuzum, F. B. and Elliot, A. H., *Am. J. M. Sci.*, 1931, **181**: 630.

Nuzum and Elliott have studied 500 cases of hypertension occurring in persons over 45 years of age, with a view to finding out the rôle played by infection, obesity, heredity, endocrine disturbances and arteriosclerosis in the etiology of the disease. The criteria for selection of the cases were that the patient should be 45 years of age or older, and have a persistent systolic blood pressure of 150 mm. of Hg. or higher. This age limit was chosen in order to eliminate a small group of persons with the Volhard-Fahr type of malignant hypertension. As controls, the authors selected the histories of 250 hospital patients falling into the same age group, and having only minor non-infectious ailments. As regards past infections the incidence in the hypertensive patients and in the controls was almost identical. Focal infection occurred in 63.4 per cent of the hypertensive group, in 62.9 per cent of 70 patients in whom renal features predominated, and in 60.8 per cent of the controls, an almost identical percentage in all three groups. However, obesity was found to be twice as common in the patients with hypertension as in those of the control group. A familial tendency to hypertension was present in 30.8 per cent of the 500 cases, but was also present in 29.6 per cent of those without an elevated blood pressure. This runs counter to many other reported studies. The incidence of endocrine disturbances, other than obesity, was found to be negligible. The effect of rest, graded exercise, and an alkaline diet was almost nil.

E. S. MILLS

The Value of Cucurbocitrin in the Treatment of Arterial Hypertension. Gargill, S. L., and Rudy, A., *Am. J. M. Sci.*, 1931, **181**: 639.

Gargill and Rudy have studied the effect of an extract of watermelon seed upon the blood pressure of 29 patients suffering from arterial

hypertension. The authors divided the cases into three groups according to the severity of the hypertension. In the first group were 10 cases with a systolic pressure of at least 200 mm. of Hg. and a diastolic pressure of at least 110 mm. In the second group were those cases in which the pressure ranged between 170 to 200 mm. of Hg. systolic, and a diastolic pressure of 100 mm. or more. The third group included those cases (12 in all) with a systolic pressure of from 160 to 200 mm. and a diastolic pressure under 100 mm. All the patients had been observed for a long control period prior to the institution of the watermelon seed therapy. The dose given was 300 mg. of the glucoside daily, given by means of 50 mg. capsules. The duration of the treatment was from two to three months, while three patients were treated for four months.

A summary of the results showed that 7 of the 29 patients showed a reduction of 25 mm. of Hg. or more, but of these 6 belonged to the group of mild hypertension. Only 2 patients in the entire series experienced complete symptomatic relief. In 10 patients the relief was so slight as to be almost negligible. In those patients who experienced relief as a result of treatment the duration of the improvement was a month or more in only two instances. In all the others the effect of treatment lasted only from one to two weeks after the drug was discontinued.

E. S. MILLS

Myocardosis, the Failing Heart of Middle Life. Hyman, A. S. and Parsonnet, A. E., *New Eng. J. Med.*, 1931, **204**: 648.

Many persons who present undisputed symptoms of myocardial impairment in life may exhibit hearts which are apparently normal even after the most searching scrutiny on the autopsy table and after section investigation. There can be no question that a purely physiological condition arises in the heart which has no pathological counterpart in so far as our present methods of laboratory investigation are concerned. The term "myocardosis" strives to bridge the gap between the pathological shortcomings and the clinical manifestations of circulatory disease.

Dyspnœa, palpitation and substernal distress may well engage the serious attention in every person approaching middle life, especially when the patient himself volunteers that one or the other or any combination of these three symptoms is giving him some concern. Physical examination is in most instances disappointing. The evaluation of the dyspnœic factor can be determined rather accurately by proper questioning. No standardized effort test can ever be as valuable as that concerned with the individual's daily routine. Sixty-four per cent of patients complaining of palpitation have some abnormality of the cardiovascular system, the remaining 36 per cent appear mostly in the younger age groups. When a patient who has previously suffered no such sensations suddenly complains of palpitation nothing less than a complete cardiac survey should appease our professional conscience.

In the early stages of myocardosis the sensation of substernal distress is not particularly painful; it is rather a sensation more akin to the feeling of compression or tightness. Patients point to the midsternal area rather than to the precordium. Substernal distress on effort is unquestionably the one which causes the patient to seek medical attention before the other symptoms.

The syndrome of early myocardosis is one in which the ordinary methods of examination are generally negative or inconclusive, and, yet, something is wrong with the patient. Into this group come thousands of individuals who pass life insurance examinations without difficulty and who are turned out of many a consulting room with a negative notation on the record, but who subsequently develop severe and unmistakable heart disease.

LILLIAN A. CHASE

Muscular Extract Treatment of Some Grave Vascular Diseases. Schwartzman, M. S., *Brit. M. J.*, 1931, **1**: 492.

This short article gives a brief description of 3 cases and a summary of the results obtained in 42 other cases treated with muscle extract. The cases treated include 4 cases of thrombo-angiitis obliterans with advanced gangrene; 19 where intermittent claudication was the chief complaint; 5 due to thrombo-angiitis obliterans; 16 to arteriosclerotic occlusion; 3 cases of diabetic gangrene; and 19 cases of angina pectoris. The results reported are rather startling, practically all patients being relieved and the majority cured. It is evident that the substance is a powerful depressor, but a great deal more work remains to be done to demonstrate the nature of the active principle. This article is but a preliminary report and further results will be anxiously awaited.

W. H. HATFIELD

Hepatitis. Deaver, J. B., *J. Am. M. Ass.*, 1931, **96**: 1293.

This condition is best classified according to the pathological picture, which can be obtained by removing a small piece at operation. The whole abdomen should be investigated, to discover and if possible remove the real cause of trouble, seeking any means to prevent the development and continuation of hepatitis, usually a hopeless and untreatable disease.

The gall bladder is most frequently the immediate source of infection. The liver may be only involved in the vicinity of the gall bladder

or may be generally diseased. The appendix is very often the origin of infection, the colon less frequently. The infection may exist in the wall of the gall bladder, and reach the liver through lymphatic channels without setting up a cholecystitis. This, however, may develop later when the infected liver tissue excretes infected bile into the gall bladder, and, to complete the vicious circle, this same cholecystitis may give further impetus to the hepatitis. Thus, any infected gall bladder should be removed.

The pathological picture varies greatly—from a cloudy swelling producing a huge liver, to a small contracted organ; from a mild invasion via Glisson's capsule and its bands separating the lobules, to a fatal hepatitis with multiple abscesses, Another type shows localized patches producing a nodular surface; adjacent organs are not seldom affected.

P. M. MACDONNELL

Diverticula of the Duodenum. Scott, S. G., *Brit. M. J.*, 1931, **1**: 346.

The term "chronic abdomen" is used to cover a variety of abdominal lesions, many of which cannot possibly be diagnosed. Duodenal diverticulæ probably account for some of these complaints and should be looked for in obscure cases. A history of fairly continuous indigestion from birth, bilious attacks as a child, epigastric pain, usually boring in type, burning unrelieved by food, and occasional vomiting followed by relief, make up a typical story. Radiographic examination should include thorough palpation of the duodenum during the screen examination, and observation, following the holding up by palpation, of the duodenal contents.

STUART D. GORDON

The Photoactivity of Cholesterin in Relation to Cancer. Roffo, A. H., *Revista Médica Latino-americana,* 1930, **15**: 1928.

In this paper the author completes an extensive series of researches on the photoactivity of cholesterin (1926-1930). Recognizing that cholesterin possesses the property of photoactivity, he tested this under exposure to solar radiation, ultraviolet rays, x-rays and radium. Solar radiation produces a photoactivity in cholesterin which lasts for a week, and varies in intensity according as the exposure is made in summer or winter. This radiation is filtered by opaque substances such as lead, copper, black paper; ultraviolet radiation gives similar results. Cholesterin is extremely sensitive to this. This property is exhibited equally by crystalline cholesterin as by an emulsion, but the latter requires a longer exposure. The author concludes that the photoactivity has the character of a gaseous phenomenon, a molecular change being induced in the cholesterin, whereby an emanation proceeds provided oxygen be present. The presence of pure oxygen or of ozone ensures more marked results, whereas in CO_2, hydrogen or nitrogen, the photoactivity does not develop. X-rays and radium yield the same results.

This all shows that cholesterin is an organic accumulator for light, which is a fact important in relation to biochemical and physico-pathological processes.

O. C. GRUNER

The Effect of Vitamin B and Insulin on Carbohydrate metabolism in Avitaminosis B. Collazo, J. A. and Bayo, C. P., *Revista Med. de Barcelona,* 1931, **15**: 105.

The changes in carbohydrate metabolism are discussed under the headings of hyperglycæmia, hypoglycæmia, hyperlactacidæmia, retention of lactic and phosphoric acids, diminution of power of reducing glutathione in the blood and organs. Vitamin B restores the pathological metabolism of avitaminosis to normal, and cures the experimentally induced disease. Some fractions are more potent in this regard than others, especially the hydrochloride of vitamin B. In avitaminosis, insulin exerts its usual glycogenic action, in addition to its secondary influence on intermediate metabolism (though to a less degree than vitamin B), but without producing a curative effect. The animals die of avitaminosis. Oral administration of insulin has the same action.

The authors therefore confirm the work of Bickel and Collazo (1923) as showing that vitamin B and insulin are not identical. The similarity of their effect is not to be ascribed to a specific action of insulin in avitaminosis, nor is it to be supposed that the changes in carbohydrate metabolism in avitaminosis are solely of pancreatic origin. The action is exactly the same which insulin has in the normal or diabetic person—namely that of stimulating glycogenesis. The lack of vitamin B produces a disease of nutrition which is characterized by the phenomena of defective carbohydrate assimilation, apart from an initial pancreatic dysfunction, and is cured only by administering preparations which are rich in vitamin B.

O. C. GRUNER

SURGERY

Recurrence of Varicose Veins Following Injection. Howard, N. J., Jackson, C. R., and Mahon, G. J., *Arch. Surg.*, 1931, **22**: 353.

According to these authors the wave of enthusiasm which greeted the injection of sclerosing agents in the treatment of varicose veins has not been justified by the ultimate results. It has become evident that there will have to be a more careful elimination of unsuitable cases, and that there must be a return to surgical procedures combined with the in-

jection of sclerosing agents, in order that satisfactory and more permanent results may be obtained.

In all, a small series of 66 cases treated by the injection method have been investigated a year or more after thrombosis, and recurrence was noted in 52. Treatment was begun in November, 1927, in order to compare the results of the injection treatment with those obtained by operation. A 20 per cent solution of sodium chloride was used as the sclerosing agent in all of the sixty-six cases. In order that thrombosis might be produced the vein was stripped proximal to the point of injection and a tourniquet was applied. The 20 per cent saline solution was used at a temperature of 105 to 110° F. For at least two weeks after thrombosis had occurred, pressure bandages were used so that agglutinization and organization of the wall of the collapsed vein might be obtained. Patients were given from one to three injections and from 10 to 12 c.c. of the sodium chloride solution at a sitting.

Thrombosis of the varicose veins was easily induced by this method. In a few difficult cases thrombosis was obtained by the injection of 30 per cent dextrose, quinine and urethane, or by frequent salt solution injections. In 48 patients complete thrombosis was obtained. In the remaining 18 cases treated there was incomplete thrombosis, due to several factors, among which were large varicosities with ulceration, hard brawny œdema of the leg and completely incompetent valves. Although thrombosis occurred in the majority of veins infected, the older thrombi recanalized or absorption occurred before injections were completed. These patients are still being treated. Several of the patients stopped treatment. In December, 1929, a definite organized attempt was made to examine all patients whose veins had been thrombosed by injection one year or more prior to this date. Seventeen of the 66 patients could not be located. From the records, 4 of the 17 had early recurrences. In only 1 patient was there firm thrombosis and no recurrence when seen nine months after completion of treatment. In the remaining 48 cases there was recurrence in every instance. The rate of recurrence is 79 per cent of all patients, or 98 per cent of those followed for a year or more. Recurrence was observed on an average in ten and one-half months. Three months was the shortest, and twenty-four months the longest time in which recurrences developed. In 49 patients there was symptomatic relief which lasted a year or more, yet 8 of these patients still had pain, in 10 there was fatigue of the calf muscles when standing for hours. Ulcers had recurred in 6 patients.

There was complete relief from symptoms in 28 patients, while there was partial or complete relief in 52. The authors do not feel that the relative freedom from symptoms is a guarantee against progressive enlargement of the recurrent veins or of such complications as ulcer eczema or œdema. A series of photomicrographs are shown of sections of thrombosed veins following injections at periods ranging from two days to ten months. The authors conclude that treatment by injection unaided by ligation, excision or stripping of main venous channels and perforating veins when incompetent will not serve to obtain permanent cure in cases of varicose veins except in the few isolated cases of dilated single veins with competent saphenous and perforating valves.

G. E. LEARMONTH

Carcinoid Tumours of the Small Intestine. Cooke, H. H., *Arch. Surg.*, 1931, **22**: 568.

Cooke reports 11 cases of carcinoid tumours of the small intestine from the Mayo Clinic. Of the two types of carcinoma of the small intestine, the carcinoid is less frequently met with than the adenocarcinomatous growth. By some investigators, the carcinoid variety has been considered benign yet a number of cases have been recorded where metastases have occurred. Of the author's cases three were malignant and eight were benign. These tumours of the small intestine are usually small, circumscribed, firm nodules, often multiple, which project into the lumen of the bowel. According to their size and tension on the superimposed mucosa the colour may vary. The larger nodules are yellow to grayish white. The size ranges from 3 mm. to 1 cm. or more in diameter. Their free surfaces are usually covered with smooth normal mucosa, but, there may be superficial erosions or ulcerations, which may produce irregular crater-like depressions. The primary nodules have the consistence of a hard fibroma. Histologically, the structure consists of irregularly arranged strands, columns, and masses of peculiar polyhedral cells, in an abundant compact stroma of coarse collagenous fibres or bundles of smooth muscle. Carcinoid tumours are most common in the appendix and the small intestine though they may occur anywhere in the gastro-intestinal tract.

The author reviews the 104 cases of this type of growth which have been reported in the literature from 1867, when Langhans described the first recorded instance. Of these 21 were malignant and 83 were benign. Among the latter, there were no regional or distal metastases. In the great majority of the cases reviewed the primary tumour has been found in the ileum. In no instance has the lesion been diagnosed before operation or necropsy. In 50 per cent of the 21 malignant cases the main symptoms tallied closely with those of

intestinal obstruction and these were nausea, vomiting, constipation with or without intermittant diarrhœa, abdominal pain, loss of weight, cachexia, palpable abdominal tumour and enlargement of the liver. In only 6 of the 83 benign cases, were these clinical signs attributable to the growth, and these were, in 4 similar to those of the malignant type with symptoms of intestinal obstruction. In 2, the symptoms were suggestive of appendicitis. The prognosis is favourable following removal of carcinoid growth of the small intestine when there are no metastases. Surgical removal of the tumours is the only method of treatment to be adopted.

G. E. LEARMONTH

The Absorption of Dextrose from the Colon. McNealy, R. W. and Williams, J. W., *Arch. Surg.*, 1931, **22**: 649.

In a previous communication (*Surg., Gyn. & Obst.*, 1929, **49**: 794), these authors found experimentally, that a 5 per cent aqueous solution of dextrose is not absorbed from the colon to any appreciable extent, while tap water and normal saline solution, are quickly and efficiently absorbed. Further experiments have been made in the present investigation to determine what effect if any sodium chloride, sodium bicarbonate and ethyl alcohol might exert on the absorption of a dextrose solution from the colon of the dog. Attention has been devoted to the nutrient value of the dextrose enema and less to the mechanism of absorption. Following absorption from the colon dextrose can be satisfactorily demonstrated in the portal blood of the vein draining the colon. Regulation of the blood sugar level in the general systemic circulation, is one of the main functions of the liver. When dextrose is ingested by the bowel, the blood sugar level in the portal blood rises higher than in the systemic blood; at no time in a physiologically normal procedure can the reverse condition occur. There are three reasons for the rise of blood sugar in the colic vein: (1) absorption of dextrose from the colon; (2) absorption from the ileum which raises the general blood sugar; (3) because of some change or changes in the liver which releases stored glycogen into the general circulation as dextrose.

It is necessary to establish the general level for systemic blood sugar each time that any other blood sugar value is taken, so that from any rise in blood sugar in the colic vein must be deducted the value of the blood sugar taken in the general vein taken at the same moment. The remainder represents the true rise in the colic vein due to absorption of dextrose from within the colon. With the dextrose-sodium bicarbonate solution there was a slight loss of water but no loss of dextrose from the colon so that there was practically no absorption of the dextrose from this mixture.

In the dextrose- alcohol experiments there was practically no loss of dextrose from the colon. Notwithstanding these facts the blood sugar levels rose rapidly in all three curves from blood from the colic, the ileal and the femoral veins. The authors conclude that the alcohol reaching the liver probably by way of the ileum, caused some change or changes in that organ which resulted in a marked general hyperglycæmia. How this process occurs is not entirely clear, possibly from a liberation of dextrose from the stored glycogen of the liver. The conclusion is warranted that alcohol has no demonstrable effect on the absorption of dextrose from the colon. There is no evidence that the dextrose enema is of any practical nutritional value.

G. E. LEARMONTH

Surgical Management of Cranial Injuries. Rodman, J. S., *Ann. Surg.*, 1931, **93**: 1017.

Cranial injuries are grouped by the author as follows: Group 1, no increase in intracranial tension: subgroup (a), inevitably fatal; subgroup (b), mild concussion. Group 2, moderate increase in intracranial tension. Group 3, marked increase in intracranial tension.

Subgroup (a) is made up of patients who never recover consciousness, are markedly shocked, in whom the temperature is usually subnormal, the pulse rapid and the blood pressure low. Often bleeding from ears, nose or throat is present, less often the loss of brain substances. Death ensues within 24 hours. The only treatment necessary is the attempt to relieve the shock.

Mild concussion does not result in a rise in intracranial pressure unless œdema of the brain develops. The treatment recommended is rest in bed for 3 or 4 days, and free evacuation of the bowels by magnesium sulphate enemata and a limited fluid intake.

Group 2 show marked concussion, slow pulse and a raised blood pressure. These patients lapse readily into sleep after recovery from unconsciousness. The spinal fluid pressure varies from 10 to 20 mm. of mercury. The treatment is as outlined for subgroup "b", with the addition of 50 per cent glucose intravenously. Repeated spinal punctures, attempting to keep the pressure at 12 mm. of mercury are also useful.

The last group includes those patients unconscious for days or weeks, having a slow pulse, which eventually becomes fast and weak, and a blood pressure gradually falling from a level higher than normal. Spinal fluid pressure is 30 mm. or higher. These cases are treated as in group 2. Subtemporal decompression should be considered but its value is doubtful.

STUART D. GORDON

Non-activated (Apathetic) Type of Hyperthyroidism. Lahey, F. H., *New Eng. J. Med.*, 1931, **204**: 747.

There are two distinct types of thyroidism, the so-called activated type and the so-called non-activated or the apathetic type. Hyperthyroidism of the activated type is not only very obvious from a diagnostic point of view but is capable of demonstrating itself as a disease exhibiting very serious possibility of a fatality if any extra burden is imposed in the way of an operative procedure.

Apathetic hyperthyroidism is seen typically in the more senile individuals from middle age on with their lessened capacity for reaction to such a toxicity as occurs with hyperthyroidism. The patients do not show eye signs. The thyroid is frequently small but usually of a firm, pebbly character due to the fact that the hyperthyroidism has existed over a long period of time. The apex beat is not forceful, nor thrusting in character; the pulse rate is frequently 120 or below. The history of loss of weight is usually progressive and has extended over a period of years. The appearance is one of senility due to the fact that there is no flushing or warmth in the skin, which is usually cool and dry and often wrinkled. The basal metabolism rates tend to be from plus 30 to plus 20. The course is chronic and without remissions. If fatality occurs after operation the course is quiet; the patients die a "relaxed" death and have no activation. Patients who seem to be good risks, are, as a matter of actual experience, very poor risks but they possess none of the danger signals which indicate that they are poor risks. A patient may run an excellent course upon the operating table, only to go back to bed and die very unexpectedly. Any patient with definite apathetic hyperthyroidism should be operated upon by a two-stage hemithyroidectomy. The right lobe should be removed at one stage, and the patient should be sent home for six weeks, to return for a subtotal hemithyroidectomy of the remaining lobe. There is no other way to avoid fatalities with these particular patients except by this procedure.

LILLIAN A. CHASE

OBSTETRICS AND GYNÆCOLOGY

Obstetric Shock. Phillips, M. H., *Brit. M. J.*, 1931, **1**: 833.

Early, or primary, shock is due to different impulses causing reflex vasodilatation and a consequent marked fall of blood pressure. It is in the reflexly dilated capillaries of the skeletal muscles that the blood is dammed up and so lost to the circulation. In obstetric cases there is also another factor in the lowering of intra-abdominal pressure which follows the emptying of the uterus. The writer insists on a tight abdominal binder being used as soon after the delivery as possible.

Delayed, or secondary, shock may set in after a latent period marked only by a fall in blood pressure. Experiments strongly suggest that traumatic shock is caused by some poisonous substance, either histamine or an ally, which is liberated from the damaged tissues and causes widespread relaxation of the capillaries. The unexpected secondary phase of obstetric shock may be due to extensive lacerations of the levatores ani, especially when such injuries are not accompanied by deep tears of the perineal body and vagina sufficient to expose the lacerated muscles.

The signs of shock are apathy, coldness, greyness or cyanosis of skin and mucous membranes, rapid, almost imperceptible pulse, subnormal temperature, shallow quickened respiration, and lowness of arterial blood pressure.

Besides the essential initiating causes produced by the original trauma, the predisposing factors are bodily fatigue from prolonged muscular exertion, cold from exposure, deprivation of food and water, sweating, hæmorrhage, anæsthetics, toxæmia of pregnancy, infection and emotion.

Every effort must be made to prevent loss of blood after injury. Chloroform and ether, but not nitrous oxide and oxygen, sensitize the capillaries to the action of histamine.

Treatment of shock should be prompt and adequate. It embraces control of hæmorrhage, application of warmth, injection of morphine, hot drinks in mild cases, or, in the more severe cases, intravenous injection of gum saline, preliminary to blood transfusion. Even subcutaneous injection of normal saline may suffice to restore a mild case, or maintain a serious one until blood is available. With the systolic pressure below 100 no operative treatment should be carried out, unless it is absolutely necessary to stop the loss of blood.

Prevention of shock may be effected by proper ante-natal management, especially in regard to provision for sleep, by refraining from premature use of forceps, by securing relief in labour from pain and mental strain by the use of large doses of scopolamine without morphine, grain 1/100, repeated every half hour for three doses and thereafter every two hours, as many as six doses having been given in the course of ten hours, without harmful effects; by recording blood pressure during and after labour, by preventing cold from exposure, by having the patient drink glucose solution (one pound to a quart of water) during labour, and by the prophylactic use of normal saline, gum saline or even blood transfusion in cases of ante-partum hæmorrhage. In cases where there is reason to anticipate shock, or in cases of toxæmia nitrous oxide and oxygen should be administered in

place of chloroform or ether. The prevention of emotional shock lies in careful and considerate ante-natal care, whereby the woman is helped to approach her confinement with a mind freed from anxiety and apprehension.

ROSS MITCHELL

Medical Complications of Pregnancy. Daly, P. A. and Strouse, G., *J. Am. M. Ass.*, 1931, **96**: 1655.

The prognosis for pregnant women with diabetes, heart disease or thyroid trouble has been considered grave, partly because they have not been managed as intelligently as non-pregnant women with these diseases. These cases should be regarded as medical, complicated by pregnancy, a wrong conception of the severity of the condition, with too energetic treatment, may cause trouble that could be avoided by better management.

Glycosuria may mean a renal diabetic, a mild type or a severe case. If one of the first kind were not recognized as a renal diabetic, the diet would be cut down till no sugar showed in the urine, a very difficult matter in these cases, with danger of lowered vitality and acidosis. All cases showing sugar are not alike. The mild diabetic may only show it during pregnancy and clear up later.

With heart cases the problem is a heart problem, building up of cardiac reserve and avoidance of too much effort. Pregnancy means more effort for the heart to handle but it is relative. The patient should not be too inactive with delivery approaching. Again, pregnancy ought not to shorten life in a case not too far advanced. A patient who dies within five years after a pregnancy would have died in any case. Where there is decompensation try to postpone induction of labour until compensation has been restored.

Thyroid changes may be factors in sterility, miscarriage and the toxæmias. (1) There is the physiological enlargement ending with lactation. (2) A period of toxic dysfunction which responds to iodine. (3) A severe toxic goitre may cause miscarriage. These cases should be regarded as medical, thyroidectomy in the early months is often very satisfactory. Induction of labour will not cure toxic goitre. Hypothyroidism shows in the basal rate not increasing steadily as in normal case. These cases liable to toxæmias require thyroid extract.

P. M. MACDONNELL

A Revised Conception of the Occipitoposterior Position. Taylor, W. A., *J. Obs. & Gyn. of the Brit. Emp.*, 1931, **38**: 85.

Patients with this complication may be divided into 4 groups: (1) Elderly multiparæ with a pendulous uterus; (2) cases with a normal pelvis, but with a very small child; (3) primiparæ with slightly reduced external measurements in whom the head does not enter the pelvis before labour, being held high by a conical cervix; (4) primiparæ in whom the head enters the brim in the occiput posterior position, late in pregnancy.

The first three groups present little difficulty. The fourth requires a careful examination, to make sure whether the biparietal diameter has passed or will pass through the brim. These patients often have a funnel pelvis, and are themselves stout women with large babies. Then, too, labour usually proceeds slowly, and the membranes rupture early owing to lack of a sympathetic control between the contractile uterus and the passive cervix.

After the decision is reached as to whether the head will go through the pelvis (and an anæsthetic may be needed for this), the patient should either be delivered by Cæsarean section or be left until the pelvic floor is being stretched by the head, when a low forceps operation may be done in safety. Oxytocics should not be used in these cases of uterine failure.

ELEANOR PERCIVAL

PÆDIATRICS

Second Attacks of Acute Poliomyelitis, and the Minimal Duration of Immunity. Still, G. F., *Arch. Dis. in Childhood*, 1930, **5**: 295.

Still reports a case of his own, which, so far as can be judged from clinical evidence, appears to be a clear instance of a second attack of poliomyelitis after an interval of five years. He collects from the literature eight cases which seem to him authentic.

In this series of nine cases, the interval between attacks ranged from two years to fourteen years. In one cases there were three attacks, at the ages of 3, 12, and 14 years. Recurrence of symptoms and extension of paralyses have been reported, occurring from one to twelve weeks after the original onset; these must be regarded as recrudescences. There is experimental evidence that the virus may be harboured by a child for at least four months, and in the 1911 epidemic in Sweden inoculation experiments showed some persons to be carriers as long as seven months after their infection.

Still states that there is no case on record of recurrence of symptoms after an interval of three months has elapsed until an interval of two years is reached; there is apparently a silent period of two years between the time when recrudescence ceases to occur and the time when liability to a fresh attack begins to appear. The conclusion is reached that, in so far as present knowledge affords evidence, one attack of acute poliomyelitis does not necessarily confer permanent immunity, but does

confer an immunity which has a minimal duration of two years.

A. K. GEDDES

Anæmia and Liver Therapy in Infancy and Childhood. Hampson, A. C. and Warner, E. C., *Arch. Dis. in Childhood*, 1930, **5**: 299.

This article is an excellent review of the anæmias of childhood, with special emphasis on the hæmolytic anæmias and on liver therapy. The normal blood picture of infancy and childhood is first presented, with charts showing the values for breast-fed infants and for the artificially fed, with and without the administration of iron. Then follows a detailed study of the hæmolytic anæmias of infancy and childhood, with illustrative case reports.

The authors believe that true pernicious anæmia occurs in children, and report two of the four cases which they have investigated. One recovered with blood transfusion; the second, a child of eight months with achlorhydria, made a good recovery after one month's treatment with liver extract. The indication for liver therapy in childhood is not limited to pernicious anæmia, for the authors record striking results in acholuric jaundice and other hæmolytic anæmias. In 1927, Hampson showed that in both pernicious anæmia and acholuric jaundice there is an increased electrical charge on the membrane of the red cells, and that this is proportional to the degree of hæmolysis as measured by van den Bergh's reaction. Later, this was found to be true in some other varieties of hæmolytic anæmia. The only cases of anæmia which materially benefit by the administration of liver they have shown to be those in which there is an increased membrane potential. Such cases are practically all of the hæmolytic variety. Moreover, with liver feeding, the electical charge becomes normal in proportion as the hæmolysis decreases. To control hæmolysis in children, they have found relatively large doses of liver necessary. Thus in one child, ten years of age, three-fourths of a pound of fresh liver daily was required, while in a child of twenty months satisfactory response was not forthcoming until a half pound of fresh liver daily was given.

The final part of the paper discusses the non-hæmolytic anæmias of childhood and their differential diagnosis. In the chlorotic type of anæmias, they have found iron ammonium citrate the most satisfactory form of medication, and up to 20 grains a day is given at the age of one year. Failure to respond to treatment is almost always due to insufficient dosage of iron. The authors regard von Jaksch's anæmia as a type of infantile reaction not due to any single cause, and believe that such cases can usually be classified in one of the other groups of the anæmias of childhood.

A. K. GEDDES

OPHTHALMOLOGY

Investigations on the Bacterial Content of Normal Corneæ. Blank, A., *Arch. f. Ophthal.*, 1929, **122**: 661.

This work on the bacteria of the normal conjunctiva and cornea was carried out on patients over forty years of age, as this age is of special importance in relation to operations for glaucoma and cataract, and also because bacteria are more numerous on the conjunctiva and cornea of older persons. The organisms found were chiefly pneumococci, either alone or with the staphylococcus. They were found both on the cornea and conjunctiva. In a few cases pneumococci were found on the cornea but not in the conjunctival sac. These tests confirm the view that besides staphylococci and xerosis bacilli chain-forming cocci live as saprophytes in the conjunctival sac and frequently on the cornea of normal eyes, especially in elderly people.

S. H. MCKEE

Electric Cataract. Holloway, T. B., *Am. J. Opth.*, 1930, **13**: 595.

A case is reported the essentials of which are as follows. A boy was subjected to a shock from an electric wire carrying 2,200 volts. As far as could be ascertained there were no inflammatory signs. A failure of vision was noticed nineteen months after the injury, and when first observed by Holloway ten months later, there was complete opacity of each lens. Operation restored useful vision in each eye. There were no demonstrable fundus changes, such as are found at times in cases of this kind.

The literature contains rather frequent references to electric cataract, either as the result of exposure to the commercial current, or that produced by lightning, but, despite this, few cases come under observation of any one man. The most characteristic feature is that the opacity does not develop until some days or months after the accident. When the lens becomes involved the process may remain partial, or go on to complete opacity.

S. H. MCKEE

A Hitherto Undescribed Affection of the Conjunctiva. Jaeger, E., *Klin. M. f. Augenh.*, 1930, **84**: 373.

Jaeger observed over a period of three years an otherwise healthy woman of 25 years who showed three attacks of conjunctival inflammation. The first occurred in the lower lid, the second on the nasal portion of the ocular con-

junctiva, and the third in the nasal third of the upper lid and upper fornix. Each attack commenced with severe pain, but without any objective symptoms. After a period of two days there appeared redness and swelling of the submucous tissue with the epithelium intact. A few days later there appeared a white discoloration, with a large defect in the epithelium and deep necrosis. The disease in the upper lid healed spontaneously with scars, but excision of the diseased tissue was necessary in the other two. The eyeball remained practically normal. Pathological findings are described and Jaeger suggests a metabolic disturbance as the cause.

S. H. McKEE

NEUROLOGY AND PSYCHIATRY

General Paralysis and Tryparsamide. Tennent, T., *J. Ment. Sc.*, 1931, **77**: 316.

In about a third of Tennent's cases, tryparsamide was used alone; in the others it was combined with fever (malarial) treatment. In analyzing his results by the duration of the mental symptoms prior to treatment, by the age of the patient, and by the clinical type of the illness. The chances of success diminish in direct ratio to the duration of symptoms, and with increase of years beyond age 40. The most favourable types are, in order, the manic, the euphoric, the simple, and the tabo-paretic. Of neurological signs those which showed most improvement were speech defect and tremors. Changes in reflexes were slight and inconstant. No pupil which was inactive prior to treatment became responsive under treatment. In the early stages the clinical and serological changes do not run parallel, but in the later stages there is a partial parallelism—all cases then showing clinical improvement also show serological improvement. Complications are few if care be taken to determine contra-indications before beginning treatment. Administration should be intravenously and may be made safely at weekly intervals over long periods. Results obtained are encouraging. Tryparsamide is a valuable substitute for fever therapy when the latter is contra-indicated, but the most effective treatment is a combination of tryparsamide with fever.

W. H. HATTIE

Focal Sepsis in Mental Disorder. Poole, A., *J. Ment. Sc.*, 1931, **77**: 316.

There has been much disputation and little agreement relative to the part which focal sepsis may play in the causation of mental disorder. Poole was seemingly stimulated to make the studies here reported by a remark of Bruce to the effect that the cause lay deeper than a toxæmia—in a failure to form antibodies—and he undertook to find a reason for the discordant opinions held concerning the rôle of sepsis. He theorizes that if mechanisms produce antibodies of sufficient quality and quantity, remote effects of septic foci will not develop. The "pathogen-selective" method was adopted in his study. This consists essentially in the use of the patient's own blood as a constituent of the culture media employed, it being assumed that inhibition of the growth of organisms found in foci will rule out such organisms as causal factors. He describes "direct" and "indirect" cultures, the latter being sub-cultures from a suspension in the patient's blood of septic material after 12 hours incubation at 37° C. Several cases are cited in which the most obvious focus or foci yielded organisms which did not grow in "indirect" cultures, whereas from less obvious foci organisms were obtained which gave more or less luxuriant growths after indirect culture through the patient's blood. Attention to such foci resulted in much improvement, although previous removal of teeth, etc., had not benefited. Poole argues that his study confirms the hypothesis of Bruce, that the method he used adds *finesse* to the preparation of autogenous vaccines and makes them more selective in their action, and that by employing this method unnecessary surgical intervention will be avoided.

W. H. HATTIE

HYGIENE AND PUBLIC HEALTH

Reduction in Diphtheria in 36,000 Toronto School Children as a Result of an Immunization Campaign. McKinnon, N. E., Ross, M. A. and Defries, R. D., *Can. Pub. Health J.*, 1931, **22**: 217.

Fourteen months after the completion of a two and a half years' campaign conducted by the Toronto Department of Health, the study of results here reviewed was undertaken. During the campaign 36,189 school children passed through the hands of the "toxoid team." Of this number, 8,980 received no toxoid; 5,648 because they were Schick negative, 3,267 because in them the reaction test was 3+ (suggesting that a considerable reaction would follow administration of the usual dose of toxoid), and 56 others for a variety of reasons. A single dose of toxoid was administered to 1,386 children, two doses to 8,994 and three doses to 16,829. All those dealt with by the "toxoid team," including the 8,980 who received no toxoid, are spoken of as belonging to the "treated" group —comprising about a third of school population. After giving due consideration to factors which might have the effect of vitiating the interpre-

tation of results, the authors conclude that since the time the immunization campaign was commenced the diphtheria rate in the "treated" group has been approximately 25 per cent of that of the untreated group, while the case fatality in the "treated" group has been distinctly less than in the untreated group. "This 75 per cent reduction in cases and 80 per cent reduction in deaths in the whole ("treated") group (with approximately 90 per cent reduction in cases with no deaths in those given 3 doses of toxoid) was obtained without producing one severe reaction, and has paved the way for a more complete immunization of the Toronto children.

W. H. HATTIE

The Epidemic of So-Called Ginger Paralysis in Southern California, 1930-31. Smith, M. I., and Elvove, E., *Pub. Health Rep.*, 1931, **46**: 1227.

A few months ago the report of the epidemic of "jake" paralysis in Oklahoma was reviewed in these columns. The article now under review reports a similar epidemic in Southern California of which the following is the author's summary:—

"A survey was made of the epidemic of ginger paralysis which occurred in southern California during the latter part of 1930 and the early part of 1931. The investigation showed that in the latter part of December of 1930, or early in January of 1931, adulterated fluid extract of ginger containing tri-cresyl phosphate was shipped from New York to Los Angeles, and thence distributed through the retail drug trade in Los Angeles, San Pedro, Whittier, Sawtelle, and, possibly, other near-by sections. The consumption of this beverage resulted in an epidemic of "ginger paralysis" comprising about 125 cases. The epidemic occurred for the most part during the last two weeks of January and the first two weeks of February. Due to the early recognition of this condition and the effective measures taken by the local city and county health departments to prevent the further distribution of this ginger extract, the epidemic was quickly brought under control. It is our belief that unless effective measures are instituted to stop completely the manufacture, distribution and sale of all misbranded fluid extract of ginger for beverage purposes similar recurrences may be expected in the future in sections where "ginger paralysis" has not been known heretofore. Further details are given of the comparatively simple technique whereby such adulterated fluid extracts of ginger may be tested, both chemically and pharmacologically."

FRANK G. PEDLEY

Obituaries

Dr. Frederick Thomas Bibby, died at Flesherton, on May 17, 1931, in his 65th year. Dr. Bibby graduated from the University of Toronto in 1888. He is survived by his widow, May Kirby.

Dr. C. E. Carthew. The death occurred at Edmonton on April 28, of Dr. C. E. Carthew, one of the early medical pioneers of the West. He registered in the North-West Territories in 1888 and practised for many years at Qu'-Appelle and for some years at Wabamum, Alberta, later moving to Edmonton. He graduated from the University of Toronto in 1877.

Dr. Benson Ambrose Cohoe. The death of Dr. B. A. Cohoe, of Pittsburg, Pa., came as a great shock to all his friends. He was about to leave on a motor trip to Toronto. The car was ready to go, when he felt a slight pain; he lay down and in fifteen minutes had passed away.

Dr. Cohoe was born in 1874, the son of Rev. B. L. C. Cohoe, a minister of the Methodist Church. He has one sister, Mrs. Weaver, who lives in Toronto. His high school course was finished in Hamilton, whence he matriculated into the University of Toronto in 1894, standing first in the province for general proficiency, and winning the Prince of Wales scholarship and ranking for three others. He entered Victoria College in the Departments of Natural Science and Mathematics, graduating in 1898. He graduated in medicine at Toronto University in 1901. While he was a splendid student, he never forgot that he was more than a student. He took a great interest in all the various activities of college life, and no function was complete without him. In his fourth year, he was editor of *Acta Victoriana*. He had wonderful ability for making friends, nor did he ever forget any of them. He was assistant in Biology in the University of Toronto, 1889-1901.

After graduating, he went to Cornell University in the Department of Anatomy (1901-03); then to Chicago (1903-06), where he was associated with Dr. Lewellys Barker. When Barker succeeded Osler at Johns Hopkins, he sent for Dr. Cohoe to work with him. Later, when the University of Pittsburg needed a man to take charge of the Department of Medicine, Dr. Cohoe was asked and accepted the position. In the last few years his work as a consultant took so much of his time that he retired from the teaching staff. He has contributed a great deal to medical literature. He wrote a number of books and articles for some of the larger systems of medicine.

In 1914, he married Miss Margaret Keighley of Toronto. He never became an American citizen. In fact, he spent his summers in Muskoka, and had planned to retire in Canada. So it is most appropriate that he should lie at rest in the city where he graduated and where he is surrounded by so many friends.

His funeral to Mount Pleasant Cemetry, Toronto, was attended by his old associates in medicine, both civilian and military. The funeral service was conducted by Rev. Canon Cody and Rev. Capt. Lambert, with whom he served, and his body was borne to the grave by six members of his own graduating class.

Dr. R. Constantine Griffith, who for 30 years had practised in Parkdale, died suddenly on June 11, 1931, at his home on the corner of Queen Street and Jameson Avenue, aged 62 years. He was born in Brantford and graduated in 1901 from Toronto Medical School. He was a member of the Royal College of Surgeons, England; of the Royal College of Physicians; England, and, in Toronto, of Grace hospital staff and the Academy of Medicine. He was a past master

of Zeta Masonic Lodge and attended Parkdale United Church.

Surviving are his widow, formerly Miss B. Barrett, and a daughter, Miss Bessie Griffith; also a son, Dr. Barrett Griffith, of New York.

Dr. Alfred Thomas Hobbs, for twenty years Superintendent of the Homewood Sanitarium, Guelph, Ontario, and formerly of the Ontario Government Hospital for Mental Diseases, London, died on May 23, 1931, at the Johns Hopkins Hospital, Baltimore, aged 65 years.

He was born in Wales and educated at London and Oxford Universities. After coming to Canada he began the study of medicine in Western Ontario University (1890), also taking a degree from the University of Toronto. He practised for two years in Waterford, after which he was appointed to the Ontario Government Hospital at London. In 1902 he was appointed to the Guelph institution, where he remained for twenty years, retiring on account of ill health. He obtained the F.R.C.S. of England in 1911.

Dr. Hobbs is survived by his widow, formerly Dorothy Ann Roberts, of Montreal, two daughters, Mrs. W. D. Hamilton, Toronto, and Mrs. R. Stuart Murray, New York, a brother O. N. Hobbs, New York, and a sister, Miss Caroline Hobbs, Toronto.

Dr. Geo. E. Josephs, of Pembroke, died in the last week of May, 1931, age 71. He graduated from McGill in 1881.

Dr. J. R. McLeod, for many years in practice at Ferintosh, died on May 5th. He was born in Zorra township, county of Oxford, Ont., where he received his early education. He was a graduate of the Detroit Medical College and came to Alberta in 1906. As a member of the first Provincial Legislature he was one of those who assisted in drawing up the Medical Practice Act.

Dr. L. N. Pickard, of Winnipeg, was found dead in bed at his home on June 18th. Dr. H. M. Speechly, coroner, announced the death was due to natural causes and an inquest was not deemed necessary. He was born at Charlottetown, P.E.I., in 1879 and graduated M.D., C.M. from McGill in 1902. After graduating he practised in St. Johns, Newfoundland, up to 1919 when he moved to Winnipeg. He was one of the original subscribers to the Medical Arts Building. He is survived by a widow, a brother and two sisters. In the field of rectal surgery he had achieved considerable success.

John Buchanan Reid, M.D., F.R.C.S., of Toronto, died at his residence on May 24, 1931. Dr. Reid had but recently retired from his lifelong practice of medicine at Tillsonburg, where he was identified with all the local worth-while public activities.

He is survived by his widow, formerly May Spence, and by four children—Mrs. Emerson McKim, of Lucknow, Dr. John Spence Reid, of the Lockwood Clinic, Toronto; Dr. R. George Reid, of the Provincial Airways, Twin Lakes, Sault Ste. Marie, and Frederick, at home.

Dr. Reid was born in Orangeville and was educated at the high school of that town, later graduating with honours from Trinity Medical School (M.D., C.M., 1887), and from Toronto University (M.B., 1887). He obtained his Fellowship of the Royal College of Surgeons, England, in the year 1911.

Dr. John Allan Speirs, of Drumbo, Ont., died on May 9, 1931, in St. Michael's Hospital. He formerly practised in Toronto, at Victoria and Wilton Streets. During the war he was on the board of doctors at the Exhibition grounds. He was educated at St. Michael's College, and Toronto University (M.B., 1905).

News Items

Great Britain

Royal College of Physicians.—T. F. Cotton, M.D. (McGill), and George Robinson Pirie, M.B. (Toronto), were elected to Fellowship in the Royal College of Physicians of London, on April 30th. Edward Francis Brooks, M.D. (Toronto), was elected to the Membership.

Registration and Regulation of Osteopathy.—On May 12th in the House of Commons the Order for the second reading of the Registration and Regulation of Osteopathy Bill was read and discharged and the measure was withdrawn.

This Bill was introduced by Mr. W. M. Adamson, the member for Cannock, and obtained a first reading in the House of Commons on February 11th. It is understood that the Bill was not regarded with favour by the British Osteopathic Association, and Mr. Adamson was not prepared to proceed with the measure unless there was agreement among osteopaths themselves.

"My Canadian Journey."—During the last few days all the members of Tour "C" who went across Canada after the Annual Meeting at Winnipeg in August last will have received a copy of a handsome volume, entitled *My Canadian Journey*, from the Canadian Pacific Railway, containing 147 photographs, intended to serve as a souvenir of a very pleasant trip. The idea arose out of a discussion on board the returning boat, when it was decided to appoint a small committee, consisting of Dr. A. E. Barclay of Cambridge, Miss Patricia Woods, and Mr. R. J. Willan of Newcastle-on-Tyne, who were deputed to collect from the members of the party photographs, not so much of places seen, as of incidents in which members of the party were concerned, to select those which were thought most suitable, and to forward them to the C.P.R., which very kindly undertook to make up an album and to give a copy to each member of the party (or, in the case of a family party, to one member of the family). The result is exceedingly attractive, and will bring back to the minds of those who took part in the trip many very pleasant recollections. The bulk of the work fell on Miss Patricia Woods, daughter of Sir Robert Woods, of Dublin, and a very popular member of the party, and it is desired here to express to her the gratitude of the whole party for the great trouble she took. The action of the C.P.R. in making up the volume and presenting it is also deeply appreciated as a characteristic instance of the generosity and kindliness which surrounded all those who went to Canada under the auspices of the company.—*Brit. M. J.*, 1931, **1**: Supp. 190.

Honour for Sir Stanley Hewett.—At a livery dinner of the Society of Apothecaries, Sir Stanley Hewett, Surgeon-Apothecary to the King, was presented to the Master by Sir William Willcox to receive the diploma of the society (*honoris causa*).

Sir William Willcox referred to the interesting history of the society, which dated back to 1617, and said that during that long period only two honorary diplomas had been conferred. One of them had been presented to the present Prince of Wales and the other to Sir John Lynn-Thomas, as representing the surgeons.

Sir Henry Martyn.—The King has conferred a knighthood upon Mr. Henry Martyn, Surgeon-Apothecary to the Household at Windsor, and has invested him with the insignia of a Knight Commander of the Royal Victorian Order. Sir Henry Martyn at-

tended His Majesty during his recent illness from bronchitis.

University of Durham.—On the occasion of the Marquess of Londonderry's installation as Chancellor of Durham University, on May 20th, Lord Dawson of Penn, President of the Royal College of Physicians of London, received the honorary degree of D.C.L.

Queen's University, Belfast.—The Senate has resolved that the honorary degree of D.Sc. shall be conferred on Dame Louise McIlroy, M.D., professor of obstetrics and gynæcology, London (Royal Free Hospital) School of Medicine for Women, University of London; on Joseph Barcroft, M.A., F.R.S., professor of physiology, University of Cambridge; on Major-General J. W. D. Megaw, Director-General I.M.S.; and on H. Hampton Young, M.D., clinical professor of urology, Johns Hopkins University Medical Department, Baltimore.

Alberta

The first of this year's series of extra-mural post-graduate lectures under the auspices of the Canadian Medical Association was given during the early part of April. According to Mr. W. G. Hunt, Associate Secretary of the Alberta Medical Association, ten towns and cities were visited and 309 physicians attended the courses of lectures given by Dr. George Hale, Professor and Head of the Department of Medicine and Dr. George A. Ramsay, F.A.C.S., Assistant Professor of Orthopædic Surgery, both from the University of Western Ontario.

During the morning sessions at the Holy Cross Hospital Dr. Hale gave an instructive lecture on "Joint lesions producing persistent disability" in which special reference was made to the shoulder-joint. A female patient seventy years of age was presented for clinical examination and discussion. There was marked swelling about the right and to a lesser extent about the left knee joint. When she was nine years of age there had been a lesion in the right knee joint with swelling about the joint. At the age of fourteen this joint was injured and infection resulted. This joint was kept in a plaster casing for four years. There had been a discharging sinus ever since. The joint was ankylosed. X-ray examination showed a progressive tuberculous destruction of bone.

Dr. Ramsay referred to the treatment of tuberculous joints and especially to the attitude of British and of American surgeons thereto. Up to the age of fifteen years conservative methods have been used, with sanatorium treatment, in Great Britain. However, London surgeons have followed the lead of American surgeons and are not averse to using radical measures with tuberculous joints. The American attitude is radical, even in young patients to the age of eight years when synovectomy and other measures are carried out. In older patients excision or amputation is performed. There is a definite pathological process pertaining to knee-joint lesions, producing persistent disability. There is an early low-grade inflammation when due to open trauma with early contamination and local or systemic infection. A tumour might be the cause of the disability. The inflammation may be of an acute or a chronic type when due to trauma, and the spreading of the infection is by continuity or by way of the lymphatics. Muscle spasm ensues as a result of the inflammation. Dr. Ramsay made reference to Hilton's classical work on "Rest and Pain" and to the author's statement that the nerves supplying muscles running over a joint innervate the joint itself, so that irritation of these muscles produces pain in the joint. The response to such irritation is a visceral-sensory-muscular reaction with muscle spasm. As a result of injury the joint may undergo various pathological changes even to calcareous degeneration, or resolution may take place with the formation of scar tissue or there may be cicatrization with resulting ankylosis. Gangrene may ensue.

Disabilities of the shoulder joint exceed all other joint disabilities. It has been estimated that one-eighth of major traumata produce a complete disability and one-eighth a partial disability. It may be stated that radiological evidence is not conclusive, nor is it negative in shoulder joint injuries.

Professor Hale discussed at length the subject of "Focal infections," clearly expressing his views as to present day ideas on this debatable subject. At the evening session Dr. Ramsay thoroughly dealt with the subject of "Back pain," and Professor Hale gave an interesting lecture on "Coronary thrombosis."

In several country districts physicians have undertaken to do the work of the provincial "tonsil clinic," where there are well equipped municipal hospitals and the necessary operative measures can be carried out with a minimum of risk and inconvenience to the young patients.

What constitutes a "first call" was argued before the Appeal Court of Alberta recently in an action taken by a country doctor against a rural municipality for the professional care of an indigent. The dispute was not on the question of indigency, as that was conceded by the solicitor representing the municipality, but by reason of the fact that the Act provides that while physicians must have written orders from the municipal authorities, before responsibility is assumed by the local council for the payment of medical services, exception is made where the physician had been told or was of the opinion that the case was one of urgent necessity; he is to issue a certificate to this effect, and the account for the first call to an indigent is therefore chargeable to the municipality. In the present case in dispute the physician was called to a point 19 miles distant in the country, where he attended a man with an acute perforative appendicitis. He brought the patient to the local municipal hospital and operated on him. The municipality contended that the events occurring after the patient had been taken from his home could not be considered as part of the initial call and thus is not provided for in the Act. The physician contended that it was a continuous call, the patient being removed to the hospital for greater safety. The patient recovered. No judicial decision has yet been given.

G. E. LEARMONTH

British Columbia

On May 12th the new Nurses' Home at St. Paul's Hospital, Vancouver, was opened with appropriate ceremonies.

A study of 2,434 cases of measles occurring in the Vancouver Schools in 1927 showed that no new cases developed among contacts during the first thirteen days of the incubation period. Applying this knowledge Dr. Harold White, the school medical officer, has permitted contacts to attend school for 12 days following exposure, and they are then excluded till the 22nd day. During a recent epidemic, the application of this rule, estimating 2 contacts to each case, has resulted in a saving of 40,000 school days or 200 school years, in an outbreak lasting two months.

It is proposed to extend the same practice to mumps and chickenpox. Advantages, apart entirely from the saving of pupil's time, are the added co-operation of parents; there is less incentive to conceal the disease, and this results in more complete control of the situation. To be sucessful, of course, there must be an adequate school health personel for supervision.

Recent statistics published by the Vancouver Health Department would show that deaths from cancer in Vancouver are increasing. In April, 1929, there were 17 such deaths; in April, 1930, 21 and in April of this year, 27. Heart disease has shown an increase from 24 in 1929 to 32 in 1931. Of other diseases, tuberculosis has remained stationary, while pneumonia has decreased from 27 in 1929 to 11 in this year.

At the annual meeting of the Vancouver Medical Association on April 28th, Dr. C. W. Prowd was elected President.

The annual graduation exercises of the Vancouver General Hospital were held on May 29th, 83 nurses receiving diplomas. C. H. BASTIN

Manitoba

The Board of Trustees of the Winnipeg General Hospital have accepted with regret the resignations of Dr. Neil John MacLean and Dr. R. F. Rorke. On June 18th, at the Clinical luncheon, they were presented with gifts from their colleagues on the attending staff, together with many expressions of appreciation of the value of the services they had rendered to the hospital.

At this clinic Dr. Douglas Quick, of New York, discussed various cancer cases brought forward by the newly formed Tumour Clinic.

Applications are being received by the Board of Trustees of the Winnipeg General Hospital for appointments for Pædiatrician and registrar for the Tumour Clinic.

A committee of the Young Men's Section of the Winnipeg Board of Trade, with Dr. W. F. Abbott as chairman, has been occupied with the question of pasteurization of milk. Meetings have been held with the Winnipeg Dairymen's Association, composed of dairymen whose milk is not pasteurized. As a result of these meetings one of the dealers has already installed a pasteurization plant and it probable that within a comparatively short time there will be 100 per cent pasteurization of milk supplied to Winnipeg consumers.

The contract has been awarded for a recreation building for the patients in Deer Lodge Military Hospital, Winnipeg. The site was donated by the Municipality of St. James, and the funds for the construction of the building were raised jointly by the Deer Lodge branch of the Canadian Legion and the Women's Tribute Association. The cost of the building will be $32,000.

At the recent examinations of the University of Manitoba Dr. Donald H. Williams won the Medical Alumni Gold Medal for highest standing in the entire medical course, the Charlotte W. Ross Gold Medal for obstetrics and diseases of children, and the Chown prizes in Medicine and Surgery. At Convocation it was announced that Dr. Herbert Meltzer (Man., '29), had been awarded the Prowse Prize for Clinical Research.

The following officers of the Winnipeg Medical Society were appointed on May 16th: *President,* Dr. J. D. Adamson; *Vice-president,* Dr. E. C. Barnes, Selkirk; *Secretary,* Dr. H. D. Kitchen; *Treasurer,* Dr. J. M. MacEachern; *Trustee,* Dr. S. J. Elkin. ROSS MITCHELL

New Brunswick

Rt. Rev. P. A. Chaisson, Bishop of Chatham, announced at a special meeting of the Gloucester County Council that construction of a ninety-six bed tuberculosis sanitarium at a cost between 250,000 and 300,000 dollars would be begun this summer. A special department for children is planned. The sanitarium will be built on the beautiful farm property given to the Bishop some nine months ago by Sir James Dunn, of England. The site is three miles from Bathurst. The present buildings have been fitted up as a temporary hospital and will be staffed by sisters specially trained in tuberculosis work. There is at present accommodation for about twenty-five patients here.

It is announced that Dr. M. A. Oulton, Chief Medical Officer of the New Brunswick Workmen's Compensation Board, a graduate of the University of New Brunswick, is undertaking the expense of equipping the Biological Laboratory at the University of New Brunswick.

A largely attended meeting of the Saint John Medical Society was held in May. A special committee was appointed to study the question of admission of free patients to hospitals and the treatment of free patients in hospital clinics. It was decided to devote at least one meeting of this Society a year to some subject with special bearing on obstetrics in the community.

The following officers were elected: *President,* Dr. Howard Bustin; *Vice-president,* Dr. O. B. Evans; *Secretary,* Dr. Jos. Tanzman; *Treasurer,* Dr. A. S. Kirkland; *Executive Committee,* Drs. J. R. Nugent, V. D. Davidson, and R. M. Pendrigh. A. STANLEY KIRKLAND

Nova Scotia

Dr. J. J. McRitchie, of Goldboro, has been appointed to the Provincial Department of Health in the capacity of a Divisional Medical Health Officer.

The 78th annual meeting of the Medical Society of Nova Scotia is to be held at Truro on July 8th and 9th under the presidency of Dr. Dan Murray, of Tatamagouche.

Hon. George H. Murphy, Minister of Health, in a recent statement to the press outlined the policy of his department in respect of tuberculosis, which he described as our major public health program. For the care of infective cases at least 200 additional beds are necessary. In addition to substantial enlargement of the Nova Scotia Sanatorium, at Kentville, special annexes to a number of general hospitals are to be provided. The first of these, to accommodate 12 patients, will be built at once by the department at the Inverness Memorial Hospital. The province and the city of Sydney will jointly bear the cost of a 40-bed annex to the Sydney City Hospital. Negotiations with other hospitals are in progress. These annexes will be further supported by the province to the extent of $1.00 per patient per diem.

Twenty-three candidates for the certificate of the Medical Council of Canada took the June examinations at Halifax.

The annual meeting of the Valley Branch of the Medical Society of Nova Scotia was held at Berwick on May 25th, under the presidency of Dr. J. A. Sponagle. Visiting speakers were Drs. W. Alan Curry, C. W. Holland, and S. L. Walker, of Halifax. The new officers are: *President,* Dr. C. E. A. DeWitt, Wolfville; *Vice-presidents,* Dr. A. B. Campbell, Bear River, Dr. I. R. Sutherland, Annapolis Royal, and J. P. McGrath, Kentville; *Secretary-Treasurer,* Dr. H. E. Kelley, Middleton. W. H. HATTIE

WANTED—Graduate class "A" school, Licentiate Medical Council of Canada, one year rotating internship, four years' experience general practice, desires assistantship or association with established surgeon. Aged 32. Good references. Apply Box 151, C.M.A.J., 3640 University Street, Montreal.

WANTED—Graduate class "A" school. 18 months' internship, seven years' general practice desires assistantship or association with established surgeon. Surgical residency in hospital also acceptable. Age 35, speaks five languages, excellent references, remuneration no consideration. Apply Box 155, C.M.A.J., 3640 University St., Montreal.

WANTED—Licentiate, Medical Council of Canada, sixteen months' internship, assistant in Department of Medicine, Henry Ford Hospital, Detroit, for past two years, desires association with Canadian internist, surgeon or clinic. Age 28, married. Apply Box 157, C.M.A.J., 3640 University Street, Montreal.

WANTED.—Assistantship or association with surgeon—Ontario city. Honour graduate Toronto 1921. Two years' internship. Eight years' general practice in West. Non-drinker. Married. Willing to relieve surgeon of night work, obstetrics, etc. Reference: Dr. E. A. Gray, General Hospital, Toronto. Apply Box 158, C.M.A.J., 3640 University Street, Montreal.

WANTED—Toronto Osteopath with large practice requires part-time cooperation of an anæsthetist. Apply Box 159, C.M.A.J., 3640 University Street, Montreal.

FOR SALE—Good medical practice and choice property for sale or lease in Western Ontario industrial city; population thirty-five thousand. Office equipment and supplies for sale cheap. Good reasons for making change. Apply Box 152, C.M.A.J., 3640 University Street, Montreal.

FOR SALE—Medical and surgical practice consisting of brick house and office combined, office furniture and equipment, drugs, etc., in town of three thousand. Twenty-five bed hospital equipped with x-ray. Average yearly business $12,000 to $14,000. Will sell for $8,500. Apply Box 153, C.M.A.J., 3640 University St., Montreal.

FOR SALE—Refraction set in good condition, 194 lenses, test frame, retinoscope and mirror. $80.00. Also McKesson pump, scarcely used, as good as new. Cost $150.00 will sell for $130.00. Apply Box 154, C.M.A.J., 3640 University Street, Montreal.

FOR SALE—Unopposed practice in Western Ontario village; no property to buy; specializing. Apply Box 156, C.M.A.J., 3640 University St., Montreal.

FOR SALE (in Winnipeg)—Portable Victor X-Ray with all accessories. Latest model. Portable Victor Diathermy with accessories. Victor Intra-red lamp. This equipment is practically as good as new. Will sell very reasonably as I am taking up a specialty. Apply Box 160, C.M.A.J., 3640 University St., Montreal.

FOR SALE—One of the best medical practices in Eastern Ontario, in Hospital zone. Apply, Arthur Flynn, Morrisburg, Ontario.

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Confirmation of this statement is contained in a paper by:—

J. D. ADAMSON, B.A., M.D.,
M.R.C.P. (EDIN.), AND
F. HARTLEY SMITH, M.D.

Canadian Medical Association Journal, Vol. XXIV, No. 6, page 793, June 1931, from which we quote the following:—

"The importance of this contribution is second to that of Whipple, Robseheit-Robbins, *et al.*, in the liver treatment of Addison's Anæmia only because it is applicable to a less fatal disease. It has made possible a healthy life to a large number of patients who were otherwise faced with many years of semi-invalidism.''

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Ontario

Dr. J. W. S. McCullough, Chief Inspector of Health for Ontario, has been appointed Secretary of the Royal Commission on Radium. The members of the Commission have left for Great Britain and the Continent.

Kingston General Hospital completes its fifteen year building plan. In 1833, a Board of Commisioners was formed to erect a hospital in Kingston. The central building which has just been reconstructed, was the result. Incidentally, this building was the first meeting place of the United Legislature of Canada from 1841 to 1844. Fifteen years ago the Governors of the Hospital decided that eastern Ontario was entitled to a hospital centre that would provide laboratory and diagnostic services previously obtainable only in the larger centres. This was done in cooperation with Queen's University. The scheme, involving an expenditure of $1,800,000, has developed a 400-bed modern hospital. The Kingston General Hospital now serves not only Kingston and Eastern Ontario but also the neighbouring United States. Services commemorating the completion of the above plan were held at the hospital on May 12th.

The Toronto General Hospital is this month celebrating the fiftieth anniversary of the establishment of its training school for nurses.

Dr. J. H. Radford, M.O.H. of Galt, has been elected President of the Ontario Health Officers Association, succeeding the Honorable Gustave Lacasse, M.D.

J. H. ELLIOTT

Quebec

The medical men of Montreal were privileged to hear, on May 16th, an address by Dr. Hugo Roesler, of Vienna, on "Some cardiac conditions as depicted by the x-ray." The address was given at the Royal Victoria Hospital. Dr. Roesler showed by means of a running comment on a most interesting series of skiagrams projected by a lantern how improved methods in taking x-ray pictures could help in the diagnosis of many congenital and acquired disorders of the heart. He emphasized, in connection with the technique, the necessity of making short exposures of one-twentieth to one-fifteenth of a second; the use of a screen to cut off the primary rays was quite important though it increased the exposure four or five times. The pictures that he showed were a revelation in the matter of detail and were of great assistance in unravelling the various conditions he spoke of. In the examinations of the chest it was often imperative that pictures should be taken in a diagonal lateral direction as well as antero-posteriorly, otherwise the exact state of affairs might be unappreciated or the correct diagnosis entirely missed. Thus a lateral view of the chest showed a dilated S-shaped aorta which would have been diagnosed as an aneurysm if reliance had been placed on an antero-posterior picture alone. Not only were the simpler conditions of hypertrophy and dilatation of the heart, displacements, and aneurysms depicted on the screen, but Dr. Roesler was able to demonstrate atheromatous aortæ, dilatation of the pulmonary artery and its branches, certain congenital conditions, such as patent ductus arteriosus, coarctation of the aorta, pulmonary artery stenosis and dilatation of the pulmonary artery and its branches, as also aneurysm of the left auricle, and adhesion, with calcification, of the pericardium. One slide was shown which revealed exactly the position and shape of the lower lobe of the left lung, in a case in which there had been hæmothorax, and its relation to the heart. In connection with concretio pericardii cum corde the lecturer pointed to the great limitation of the movement of the heart as seen with the fluoroscope was a most important diagnostic sign of the condition. The diagnosis was all the more certain if calcareous deposits could be seen outlining the heart. In reference to the movement of the heart the lecturer stated that the range of movement was greatest in connection with the auriculo-ventricular septum, and this had been proved by experimental studies also. Another diagnostic point, sufficiently remarkable, in connection with dilatation of the pulmonary artery and its branches was erosion of the ribs, which was distinctly visible in the plates, a condition resulting from the pressure of the dilated intercostal vessels. One plate shown indicated that considerable erosion of the vertebræ, which was unsuspected before, could be produced by the pressure of an aortic aneurysm. The fluoroscopic examination, together with the skiagrams, taken by his special technique, threw much light on the nature and extent of many chest conditions.

The physicians in Montreal specializing in anæsthetics, to the number of about 30, have organized the Montreal Society of Anæsthetists. The objects of the society are to promote the science, practice and teaching of anæsthesia, to facilitate the means of acquiring fuller knowledge of the specialty and to protect the public against the administration of anæsthetics by unqualified persons.

The officers of the society are: *President,* Dr. Charles Laroeque, of the Hôtel Dieu; *Vice-president,* Dr. Wesley Bourne; *Secretary,* Dr. Harold Griffith; *Executive Committee,* Dr. A. Brosseau and Dr. J. W. Armstrong.

Following are officers of La Société Médicale de Montréal for 1931: *Président,* Dr. J. A. Jarry; *Vice-président,* Dr. Albert Lasalle; *Secrétaire-Trésorier Général,* Dr. Léon Gérin-Lajoie; *Secrétaire des séances,* Dr. Paul Letondal.

Dr. Paul Letondal, Physician to the Hôpital Ste. Justine for children, has been appointed Associate-Professor of Pædiatrics at the University of Montreal, School of Medicine, for his thesis on "l'Anhydrémie des enfants du premier âge".

The city of Montreal will make a grant of $1,000,000 to the University of Montreal Hospital.

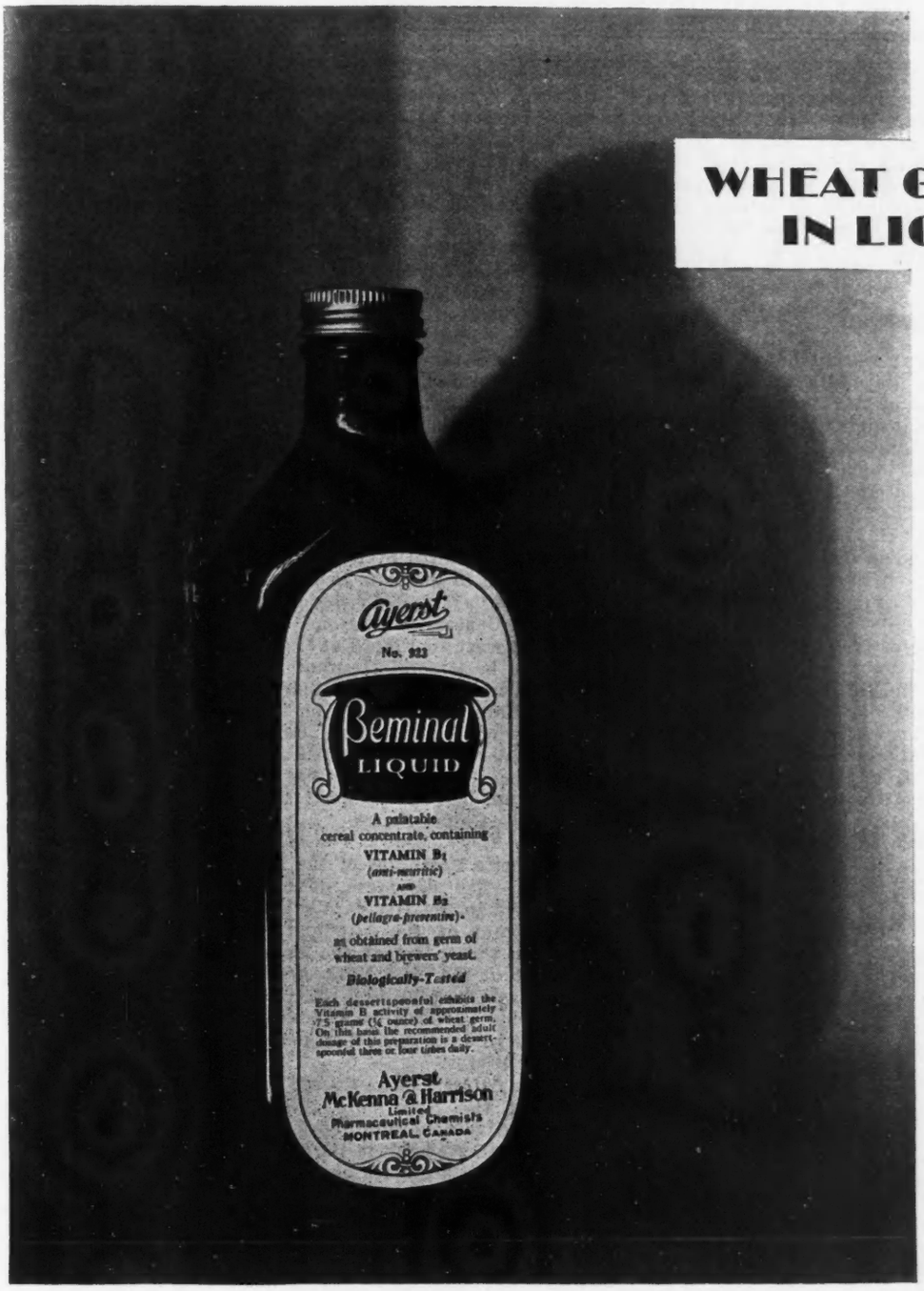
The hospital authorities intend to erect a university hospital in connection with the new university buildings, now nearing completion on the northern slope of Mount Royal. The city would benefit from the additional number of beds available for public cases, it was emphasized.

The grant will be made in annual instalments of $75,000.

Honorary Fellowship in the Royal College of Surgeons of Ireland has been conferred upon Dr. George E. Armstrong, Emeritus Professor of Surgery at McGill University.

Dr. Armstrong is a graduate of McGill University, and among the important offices he has held have been the presidency of the American Surgical Association, presidency of the Canadian Medical Association, presidency of the American College of Surgeons, vice-presidency of the American Society for the Control of Cancer. Dr. Armstrong is also a member of the International Surgical Association.

Professor Willey's New Book.—Professor Arthur Willey, Strathcona Professor of Zoology, is the author of a new book, "Lectures in Darwinism," the publication of which was announced in the press in April. Professor Willey, who is a Fellow of the Royal Society, came to McGill in 1909, after varied experience,



BEMINAL LIQUID

"Subminimal diets which fall just short of adequacy may, without producing outspoken disease, lead to chronic gastritis and enteritis with impairment of neuromuscular control of the intestine. Indeed there is good reason for believing that chronic vitamin B deficiency of this character is responsible for many of the obscure, indefinite digestive disorders—disorders which so often destroy the happiness of the patient and baffle the physician. We are accustomed to call these patients neurasthenics and chronic intestinal invalids, whereas many of them are sorely in need of food of the proper vitamin content. In addition, it is possible that many nervous disorders, particularly of the so-called 'functional type', result from a failure of the diet to provide vitamin B in sufficient amount."—JAMES S. McLESTER, Professor of Medicine, University of Alabama. ("Nutrition and Diet in Health and Disease," Second Edition, 1931, page 324).

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which included research carried out in the island of Ceylon. Referring to the popular love for arguing on evolution, the *Montreal* Star notes that Professor Willey's latest book emphasises the futility of attempting to answer the claims of opponents or supporters of the theories of evolution by a categorical yes or no. "There is no possibility of settling such a question without reservation," Professor Willey declares.

Saskatchewan

A meeting of the Eastern Saskatchewan Medical Society, which was held on May 16th at Whitewood, was attended by 90 per cent of the members; twenty-two were present. Dr. Malcolm Cameron and Dr. F. W. Rolph, of Toronto, addressed the meeting. Dr. A. M. Young, of Saskatoon, spoke on municipal appointments and also discussed the ever-present problem of indigents. Hon. F. D. Munroe, was elected *Honorary President*; Dr. G. H. Craig, of Broadview, *President;* Dr. F. W. Hart, Indian Head, *Vice-President;* Dr. J. A. Keyes, *Secretary-Treasurer.*

LILLIAN A. CHASE

Miss Pauline Creighton, daughter of Mrs. Arthur Creighton and the late Mr. Creighton, of Cupar, was married early this summer to Dr. Duncan Croll, son of Dr. and Mrs. Andrew Croll, Saskatoon. Both bride and bridegroom are well-known in Saskatoon, the former having received her Bachelor of Arts and Master of Arts degrees from the University of Saskatchewan. Dr. Croll is a graduate in medicine of McGill University and has taken post-graduate work in London, Edinburgh, Vienna and Paris.

United States

Medical Section White House Conference.—The Medical Service Section of the White House Conference on Child Health and Protection held its final meetings in Washington on February 19, 20, and 21.

One question asked of over 3,500 physicians listed in the Medical Directory of the American Medical Association was to estimate the effect on their practice of general and local public health campaigns. The replies showed that the practice of more than 50 per cent of the men had been helped by such public health campaigns and that in less than 5 per cent had any harm been felt. In other words, the general public interest that has been aroused in the health of children has helped the private practice of the majority of physicians.—*The Diplomate.*

Dr. R. Tait McKenzie, educator, physician and sculptor, has been appointed research professor of physical education at the University of Pennsylvania. The new-established professorship is believed to be the first of its kind in the United States.

Dr. McKenzie has been director of physical education and professor of physical education and physical therapy at the university for many years. He is a graduate of McGill University, Montreal, and was Demonstrator of Anatomy for some years in that institution. He went to the University of Pennsylvania in 1904.

Medical Men as Artists.—More than 250 examples of painting, drawing, photography, statuary, wood-carving, and metal work by medical men were on exhibition this spring at the New York Academy of Medicine. This was the fifth exhibition of the New York Physicians' Art Club which invites all members of the medical profession who wish to do so to exhibit their work in the plastic or graphic arts. "With a few exceptions," writes Stephen Bourgeois in the catalogue, "most of the doctor-artists are in fact more interested in technique, in skill, in methods of composition, or colour arrangement than in actual expression, although they probably believe the contrary." The artist-critic is strangely surprised to find that the doctors are "inveterate optimists."

Colonel Robert Urie Patterson, Medical Corps, United States Army, has recently been appointed Surgeon-General of the Army, with the rank of Major-General. This is the highest honour that can be bestowed on an officer of the Medical Corps, and the appointment is made upon the recommendation of the Secretary of War and approved by the President for a term of four years from the date of acceptance. So far as is known, this is the first time a McGill man has been so honoured.

Major-General Patterson was born in Montreal on June 16, 1877, the son of the late William J. B. Patterson and Eleanor H. Lay Patterson, and is one of five brothers, all of whom served with distinction with the American army during the World War. The family moved to the United States, but Robert, when of college age, returned to graduate in Medicine at McGill University in 1898.

Major-General Patterson, shortly after the War broke out, went to France as O.C. of Base Hospital No. 5, later to be General Hospital No. 11, British Expeditionary Force. He was cited in despatches by Sir Douglas Haig for gallantry on the Western Front, and received the Distinguished Service Medal and the Italian Order of the Crown.

General Patterson also saw service in the Philippines in 1903 and has occupied many parts of distinction since in the United States.

Graduate Fortnight of the New York Academy of Medicine.—The disorders of the circulatory system which have in the last decade placed heart disease in the forefront of the principal causes of death will constitute the theme of the Fourth Annual Graduate Fortnight of the New York Academy of Medicine.

This graduate course of instruction will consist in a series of lectures and clinical demonstrations, concentrated in a period of two weeks from October 19 to 30, 1931.

Lectures will be delivered evenings in the auditorium of the New York Academy of Medicine, 2 East 103rd Street, New York City. Clinical demonstrations will be held during the afternoons in twelve of the leading hospitals of the city.

An outstanding feature of the 1931 Graduate Fortnight will be the anatomical, bacteriological, and pathological exhibition of specimens and research material bearing upon the subjects dealt with in the evening meetings and clinical demonstrations. This exhibit will be housed in the Academy and will be open for leisurely study. A number of the exhibited items will be demonstrated on schedule and subjected to group discussion.

The medical profession is invited to attend and to participate in the Graduate Fortnight. There is no charge for attendance at any of the clinics or meetings, but registration for the clinical demonstrations is required.

A complete program and registration blank for the clinics and demonstrations may be secured by addressing the New York Academy of Medicine, 2 East 103rd Street, New York City.

The Inter-State Post-Graduate Medical Association of North America.—This Association will meet in Milwaukee, Wis., from October 19th to 23rd. The *President* is Dr. Henry A. Christian, of Boston; *Secretary,* Dr. Edwin Henes, Jr., of Milwaukee; *Chairman of the Program Committee,* Dr. George W. Crile, of Cleveland. The tentative list of the contributors to the

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program shows that many of the outstanding men in the United States will take part. Among the Canadians reading papers, we note the following: Drs. E. M. Eberts, Montreal, F. N. G. Starr, Toronto, Campbell P. Howard, Montreal, R. D. Rudolf, Toronto, and Alan G. Brown, Toronto.

General

American Public Health Association.—The American Public Health Association announces that its sixtieth annual meeting will be held in Montreal from September 14th to 17th, with the Windsor Hotel as headquarters. The association has not held a meeting in Canada since 1908 and public health workers from the Dominion and from the United States are invited to take advantage of this opportunity for closer contact. The program is being planned with the progress and needs of both countries in mind. Such subjects as toxoid immunization; rural sanitation, particularly the organization of a practical program for county health units; health education for a large city, for a small city, and for a rural community; camp and resort sanitation, including fungus skin infections, particularly those transmitted in swimming pools; and general sanitation of auto camps have been considered so important by the program committee that special sessions will be devoted to them. Each section of the association will arrange individual programs covering public health administration, laboratory research, vital statistics, public health engineering, food, drugs and nutrition, child hygiene, public health nursing, health education, epidemiology, and industrial hygiene. Meetings of four other organizations,—the American Association of School Physicians, the Conference of State Sanitary Engineers, the International Society of Medical Officers of Health, and the International Association of Dairy and Milk Inspectors,—will take place during or immediately preceding the sessions of the association.

For further information address the American Public Health Association, 450 Seventh Avenue, New York.

International Congress of Light Therapy.—The second International Congress of Light Therapy will be held at Copenhagen from August 15 to 18, 1932, under the presidency of Dr. Axel Reyn, chief physician to the Finsen Institute in that city. The main topics to be discussed are the part played by the skin pigmentation in the therapeutic uses of light; the way in which light baths act in tuberculosis; sunshine and climate in relation to public health administration; and the report of the international committee on ultra-violet light standardization. Any medical practitioner may attend the congress, and further particulars may be obtained from the general secretary, Dr. A. Kissmeyer, Finsens Lysinstitut, Copenhagen.

International Congress of Radiology.—The third International Congress of Radiology will be held at the Sorbonne, Paris, from July 26th to 31st, with Mme. Curie as president of honour and Dr. Antoine Béclère as president. More than 300 communications have been announced. The congress will be divided into six sections: (1) radio-diagnosis; (2) radiotherapy and radium therapy; (3) radio-physics; (4) radio-biology; (5) electrology; (6) natural and artificial heliotherapy. Further information can be obtained from the general secretary, Dr. Ledoux-Lebard, 122, Rue La Boëtie, Paris, 8e.

Memorials to Clemens von Pirquet.—On May 12th two impressive ceremonies took place in Vienna at the unveiling of memorials to the late Prof. Clemens von Pirquet, director of the University Kinderklinik, who died in 1929. In the Centralfriedhof, where his grave is among those granted by the city of Vienna to her most distinguished citizens, the memorial takes the form of a sculptured relief symbolic of his work for children, with a portrait in profile by Prof. Müllner. This was unveiled by Dr. Schober, the present Foreign Minister and late Chancellor, and the speakers included Dr. Miklas, the President of the Republic, the American Minister, Dr. Grassberger, the Dean of the Medical Faculty of the Vienna University, and Dr. Tandler, on behalf of the city. They bore witness not only to Pirquet's achievements as scientist and physician, but to his great work for the Austrian children in the years following the later war.

The unveiling in the garden of the Kinderklinik of a portrait bust of Pirquet, executed by Prof. Heu, took place in the afternoon and was of a more intimate character. Around the pedestal were grouped numerous laurel wreaths with inscriptions testifying to the international character of Pirquet's work. The ceremony was opened with singing by a choir of children from the tuberculosis sanatorium on the roof of the Klinik which Pirquet founded and in which he always took the deepest interest. After the bust had been unveiled by Prof. Arzt, the vice-dean of the Medical Faculty, there were speeches by Prof. Hamburger, the present director of the Kinderklinik, by Miss Harriette Chick, representing the Lister Institute and the Medical Research Council, with whose researches on nutrition in Vienna after the war Prof. Pirquet generously cooperated, by Dr. Noeggerath of Freiburg for the Deutsche Gesellschaft für Kinderheilkunde, and by Dr. R. Wagner on behalf of Pirquet's former staff at the Klinik and his pupils in general. The matrons of the Kinderklinik and of the Schwesternschule in Dresden spoke of what he did for the nursing profession in Austria and other parts of Europe.—*The Lancet.*

Post-Graduate Course in Medicine, St. Michael's Hospital, Toronto

SEPTEMBER 14TH, MONDAY

9 a.m. Disseminated sclerosis—Dr. J. Loudon.
10 " Cardio-vascular disturbances—Dr. H. McPhedran.
11 " Preventive medicine and municipal health problems—Drs. Jackson and Pequengnat.
2 to 5 p.m. Blood diseases—Dr. H. G. Hall.

TUESDAY

9 a.m. Tuberculosis of the chest—Dr. J. Elliott.
10 " Hyperthyroidism and hypertension—Dr. D'Arcy Prendergast.
11 " Tabes dorsalis—Dr. W. B. Edmonds.
12 " Treatment of pulmonary disease—Dr. E. A. Broughton.
2 to 5 p.m. Demonstration of clinical cases—Dr. W. B. Edmonds.

WEDNESDAY

9 a.m. Cardio-vascular disturbances—Dr. H. McPhedran.
10 " Nephritis—Dr. A. R. Hagerman.
11 " Common skin diseases—Dr. F. C. Harrison.
2 to 5 p.m. Demonstration of clinical cases—Dr. A. R. Hagerman.

THURSDAY

9 a.m. Gastro-intestinal disturbances—Dr. A. Mackenzie.
10 " Pneumonia—Dr. J. Loudon.
11 " Preventive medicine and municipal health problems—Dr. Jackson and Pequengnat.
12 " Pleurisy—Dr. R. T. Smylie.
2 to 5 p.m. Demonstration of clinical cases—Dr. E. A. Broughton.

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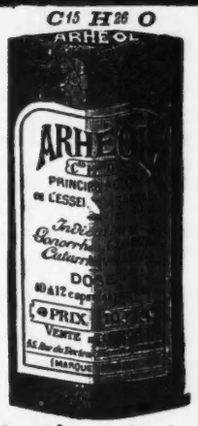

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FRIDAY

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10 " Tuberculosis of the chest—Dr. J. Elliott.
11 " Treatment of pulmonary disease—Dr. E. A. Broughton.
2 to 5 p.m. Electrocardiography and demonstration of clinical cases—Dr. D'Arcy Prendergast.

SATURDAY

9 a.m. Abdominal pain—Dr. W. B. Edmonds.
10 " Gastro-intestinal disturbances—Dr. A. Mackenzie.
11 " Leukæmia—Dr. A. R. Hagerman.

The above course will be given free of charge to all qualified medical practitioners. Further information will be gladly furnished by Dr. W. B. Edmonds, 170 St. George Street, Toronto.

Book Reviews

Heart Disease. Paul Dudley White, M.D., Instructor in Medicine, Harvard Medical School. 931 pages. Price $12.00. Macmillan Co. of Canada, Toronto, 1931.

This book is an admirable reflection of the teaching of the modern school of cardiology by one who has contributed very considerably towards its development. In the preface as well as throughout the book, the author reveals himself as pre-eminently a practicing physician of the clinic and consulting room who is keenly interested in all aspects of the problems presented by patients with heart disease. The first two hundred and ninety pages are devoted to methods of examination. The chapter on history taking does not offer merely the usual advice about how important it is to obtain a good clinical history but in a vigorous, simple style the author presents the policies that should be pursued and offers suggestions learned from his long and varied experience. The chapters on the use of various instruments, the polygraph, x-ray and electrocardiograph devote a minimum of space and attention to the mechanics and technique of using the instruments. But, the observations that can be made with these instruments are systematically described and their relative significance from the point of view of diagnosis, treatment and prognosis is thoroughly discussed.

The remainder of the text is devoted to the author's treatise on the diseases of the cardiovascular system. The plan he adopted for arranging his material is a novel one; it is based on the method of describing a complete diagnosis which is now being widely used, namely to state the etiology, structural change or changes and the disorders of function; then treatment is described and prognosis discussed. The clinician who follows this policy in summing up his observations in each case must do careful, painstaking work and thus the standard of medical activity is raised. This method of classifying present day knowledge of heart disease is logical but judging from this book it increases rather than diminishes the difficulties of the author when applied to so wide a field as a book. Largely because of this general plan in the construction of the book much repetition as well as frequent cross references to distant parts of the book become unavoidable. After reading the whole book rather carefully one wonders whether the same material organized according to the time-honoured system, namely separate chapters dealing with all aspects for each etiological factor, would not make it more suitable for students as a text-book and for physicians as a reference book. The author's method is new; it will be interesting to see what he will learn from his experiment when the second edition appears.

On looking through the ample bibliography which occupies one hundred and eighty-nine pages one is impressed by the fact that for almost every chapter there is a reference to observations published by the author and his associates. This book is obviously written by one of the foremost authorities and will most likely become the standard text-book on heart disease, at least for this generation.

An appendix in which 108 unsolved problems are listed makes both interesting and stimulating reading. The manner in which some of these problems are stated throws additional light on the point of view of the author in dealing with various controversial subjects. The index is very complete and thus adds to the efficiency of this volume as a reference book.

Practical Anæsthetics for the Student and General Practitioner. Charles F. Hadfield, M.B.E., M.A., M.D., Sen. Hon. Anæsthetist, Prince of Wales's Hospital, etc., Second edition. 336 pages, illustrated. Price $2.25. London, Baillière, Tindall & Cox; Toronto, Macmillan Co. of Canada, 1931.

The second edition of this book makes its appearance after a period of nine years. The first edition is already in use in many medical schools, both in Canada and Great Britain. The author claims in the preface that the book is primarily intended for the theoretical instruction in anæsthesia of the medical and dental student and practitioner and he has fulfilled that duty admirably. The student and occasional anæsthetist who has digested the contents of this handbook will proceed with more confidence and intelligence to the practical side of the administration. Indeed many specialists in anæsthesia will find both pleasure and profit in the reading of it. No attempt has been made to go beyond the elementary principles of the physiology of anæsthesia, and the reader is not led out of his depth into the subjects of bio-chemistry and metabolism. Most of the modern methods of anæsthesia are discussed and the chapter on spinal anæsthesia is clear and concise. The routine use of stovain may be taken exception to in this country, where novocain is considered to be the least toxic agent.

The differences in anæsthetic methods between the two countries are exemplified by the rather extensive chapters on chloroform and A C E mixture, which agents have fallen somewhat into disfavour, or at least comparative disuse, in this country, but the author has taken pains to emphasize the dangers of these substances in inexperienced hands. Some of the apparatus described also has been superseded here by more modern devices. A chapter has been devoted to regional anæsthesia; splanchnic analgesia by the posterior approach may seem somewhat ambitious in a work of this nature. Local and block analgesia in dental practice are dealt with briefly. The volume may be confidently recommended to anyone interested in this important subject.

Diseases of the Tongue. Walter G. Spencer, M.S., F.R.C.S., Consulting Surgeon, Westminster Hospital and Stanford Cade, F.R.C.S., Assistant Surgeon, Westminster Hospital, etc. Third edition. 561 pages, illustrated. Price 35/- net. London, H. K. Lewis & Co., 1931.

In this book the authors have contrived to present a very thorough description of those conditions which may affect not only the tongue but also the whole mouth and its accessory glands. Rather more than the first half of the volume is concerned with the most complete description that we have seen of intra-oral diseases. These range from lupus and lichen planus and other dermatological affections to dental caries. The most important diseases, however, get an adequate degree of prominence, and chronic superficial glossitis and leukoplakia are exhaustively treated. It is remarkable to realize how little has been added to the teaching of that master, the late Sir Henry Butlin, about these pre-cancerous conditions. Our knowledge is practically that which he

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taught thirty years ago. All this first portion of the book is well set out and the multitude of diseases clearly differentiated.

The remainder is devoted to the subject which most readers will study—cancer of the tongue. In this section Mr. Cade's experience and enthusiasm are made clear. The whole subject is treated in a masterly manner. The classification of cases and the treatment suitable for those in a given category are plain for all to see. Radium is given its rightful place in treatment. The indication for irradiation, when and how to apply it, and also how not to do it, are set down with the clarity born of experience. The section of the book devoted to cancer is something which any doctor who is responsible for treating this condition must read.

The rest of the book is an encyclopædia of intra-oral diseases which ought to be available for reference for any one in active practice.

A System of Bacteriology in Relation to Medicine. Vol. 6. By various authors. 538 pages. Price £1 1s. 0d. Published by His Majesty's Stationery Office, London, 1931.

This volume comprises the sum and substance of all the work accomplished in this subject by the various schools. The need of such a comprehensive and complete work in this field, in English, has long been felt and this volume will be enthusiastically received by all those interested in this science. The proficiency of those contributing to this particular volume, all of whom are experts in their respective branches, is sufficient guarantee to the reader of the excellent manner and skill with which each individual subject has been treated and consequently renders an extensive review of the work superfluous. The authors are to be congratulated for their lucid exposition of so much valuable material in such a condensed form, enriched with copious references at the end of each chapter. The volume is undoubtedly the best text-book of its kind hitherto published and is a valuable asset to the immunologist.

Discovering Ourselves. A View of the Human Mind and How it Works. Edward A. Strecker, A.M., M.D., and Kenneth E. Appel, Ph.D., M.D. 306 pages. Price, $3.00. Macmillan Co. of Canada, Toronto, 1931.

This book has been prepared to meet a need which the authors believe exists for a more intelligent understanding of mental hygiene. Viewed in this light, it is a valuable contribution. Having pointed out and illustrated the intimate relationship which exists between the human mind and body, the authors give a presentation of the workings of the mind according to the concepts of modern psychology. This is done so clearly that the reader cannot fail to understand the point of view which is set forth. The second part of the book is devoted to the psychology of every-day life. In this part, after describing the ego, sex and herd complexes, and how these lead to conflicts, the authors follow with a series of chapters wherein the methods of evading conflict are discussed. These chapters present a simple, clear and concise review of the reasons for evasion and the mental hazards involved. The final chapter is on "Sublimation", which is described as "a psychological mechanism that is not a mental hazard".

The book will be welcomed and appreciated by all who are interested in gaining an understanding of mental health.

Medical Administration of Teaching Hospitals. Emmet B. Bay, M.D. The Medical Economics Series. 110 pages with appendix and index. Price $2.00. The University of Chicago Press, Chicago, 1931.

This volume is a summary of a study of the medical aspects of administration in teaching hospitals and forms part of a broader study of medical practice and education directed by Dr. Michael M. Davis under a grant from the Rockefeller Foundation. In making this survey, Dr. Bay has chosen nineteen leading hospitals and clinics in the United States, nearly all of which are associated with medical schools. The utter lack of uniformity in the organization of the teaching hospital and the lack of uniformity, and, frequently, the lack of understanding of the relations between the hospital administration and the teaching staff have made it desirable to compare the solutions to these problems which have been achieved in the hospitals and clinics selected. For this purpose the author has made a comparative functional analysis, indicating how, by whom, and in what relationships the various tasks and functions considered are carried out in each place. The appointment of salaried or full-time physicians on the staffs of hospitals has introduced a new problem in medical administration. The organization of the attending staff, the allocation of beds, the coordination of clinics and the general administrative organization are studied in each hospital. A short chapter is devoted to the duties of medical chiefs, clinicians and residents. In some hospitals, the duties of the resident are largely executive, administrative and coordinative, in others, more clinical.

This study is rather an analysis of varying methods than the selection of an ideal system. It will be of value to hospital administrators, especially of teaching hospitals, and to those heads of services or faculty members who are concerned with the organization of the clinical facilities in teaching hospitals, although much of the data submitted will be of interest to the staff members or the administrators of any large hospital.

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